HORTICULTURAL ABSTRACTS

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EAST MALLING, KENT, ENGLAND

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SUMMARY OF CONTENTS

HORTICULTURAL ABSTRACTS

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Initialled abstracts and reviews not by Bureau staff are by H. C. Yin of the National University of Pekin, by J. Taylor and S. G. Thompson of the East Malling Research Station, and by G. St. C. Feilden.

INDEX OF CONTENTS.

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

MISCELLANEOUS.

General.

2341. HOWARD, H. 63(016)

The Commonwealth Agricultural Bureaux Organisation.

Farming, 1948, **2**: 215-8.

A matter-of-fact account of the whole organization to which this Bureau belongs. History, development and functions are briefly set out.

2342. DENNIS, R. W. G. 632.1/4+632.8

Commonwealth Mycological Conference.

Research, 1948, **1**: 548-52, bibl. 19.

An observer's account of discussions of recent advances in plant pathology. Virus diseases of potatoes, soft fruits, cacao, tea and tobacco were discussed. Plant quarantine legislation was discussed, and a resolution prepared for submission to the African Phytosanitary Conference, which was held in London after this meeting. Other subjects

discussed included nutritional disorders, new fungicides and the control of their sale, and the use of fungicides in the tropics.

2343. Brooks, F. T., Dalling, T., and Ogg, W. G. 63(072)
A survey of some outstanding problems in agricultural science in the Empire.
Rep. Roy. Soc. Emp. Sci. Conf. Lond. 1946, 1948, Vol. 1, pp. 308-22.*
The authors have set out some of the fundamental scientific problems, the solution of which would materially assist agriculture. Amongst the plant problems referred to (by F.T.B.) are the following: the explanation of reaction to length of day; the understanding of the water relations of plant tissues; the determination of the nature of the substances secreted by roots and exhaled by leaves and fruits; the physiology of latex production in rubber trees; the function of trace elements in plant physiology; the understanding of what constitutes frost resistance; the physiological interpretation of genetic characters; the nature of fungicidal and insecticidal action; the study of soil organisms secreting antibiotics as possible controllers of dangerous parasitic fungi; the study of polygenes determining the inheritance of quantitative characters of crop plants; methods for inducing mutations in particular directions; greater knowledge of the degree of isolation required to prevent crossing of pure crop varieties; the need for methods of hastening the reproductive stage and extending the flowering period, particularly of arborescent plants; the establishment of collections of living genetical material, both wild forms and selected stocks; the need for the ecological approach to the study of growing crops, e.g. ecological surveys, aided by aerial photography to assist in better land utilization; the best means of using, or rehabilitating, wholly or partially, derelict land in the tropics; the need for a comprehensive biological survey of tropical territories.

2344. Lenfant, J. 634/635: 371.2/3(44)
L'enseignement horticole en France et à l'étranger. **(Horticultural education in France and abroad.)**
Rev. hort. Paris, 1948, **120**: 152-72.
A broad review of elementary and higher education in horticulture in France, Algeria, Morocco, England, Belgium, Denmark and the Netherlands.—Ecole Nationale d'Horticulture, Versailles.

2345. Maan, W. J. 634/635(61+64+65)
De tuinbouw in Frans Noord-Africa. **(Horticulture in French North Africa.)**
Tuinbouw, 1948, **3**: 130-5, 160-4.
An illustrated account, with maps, of the author's impressions of horticulture in French North Africa obtained during two visits. In the first half he describes climatic conditions and horticultural crops in Algeria, Morocco, and Tunisia. In the second he deals with the more southern regions, particularly with regard to the national character of the inhabitants in relation to horticulture.

2346. Yeager, A. F. 581.9(23)
Plant exploration at home.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 416-8.
The author urges the further collection and study of wild plants native to North America and points out the fallacy of breeders in assuming that, when they cross with a wild plant representing a species, they have thereby introduced into the progeny the total of the characteristics of the wild species. Emphasis is laid on the possibility of finding valuable breeding material, including frost-resisting plants, amongst the wild strawberries of the U.S.A. A list is given of other North American wild plants (fruits, nuts, vegetables, and flowers) of possible value to plant breeders.

* Separate papers on the agricultural problems of Australia, New Zealand, South Africa and India, are also included in this volume.

2347. Preston, A. P. 551.56(42)
Weather conditions during 1947.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, p. 85.
The wettest March ever recorded at East Malling showed a rainfall of 4·97 inches. Rainfall during the year amounted to 23·72 inches, 2·52 inches below the 30 years' average for this Station. There was sunshine for 1,724·2 hours, 246·3 hours more than the 30 years' average. Late spring frosts were absent.

2348. Noury, E. 581.04: 634.1/2
Effets produits sur la végétation par une nappe de gaz ammoniac. **(The effects of ammonia on plants.)**
C.R. Comité Pomol. Soc. Centr. Hort. Seine-Inférieure, 1947, 14 Dec., pp. 2-3.
On the 1st July, a night of light fog, gaseous ammonia escaped from a tank at Montéralier-Buchy. On the 7th August a nearby Pomme d'Août apple tree, carrying nearly ripe fruits, flowered, giving a second crop at the end of October. A Muscadet cider apple, that had not flowered in the spring, also blossomed and gave a fair crop in November. The implications are briefly discussed.

2349. Harvey, H. G. 612.87
Flavour—a review of the literature.
Sci. Tech. Surv. Brit. Fd Manuf. Industr. Res. Ass. **1**, 1947, pp. 47, bibl. 68.
To all breeders of new fruits and vegetables, whatever their primary aim, e.g. earliness, lateness, disease or frost resistance and the like, an all-important factor is flavour. Its determination is never so easy as would appear likely at first thought, and the differences of opinion in a panel of experts are often surprisingly large. This is the first work seen by the reviewer in which all the factors which go to determine flavour are very carefully and interestingly set out and examined under the following headings:—Mechanism of perception of taste and odour, odour, taste, flavour judgment tests, nutritional needs and flavour sensitivity. These sections are followed by a general discussion which includes a note on the measurement of flavour.

Technique in laboratory and practice.

2350. Sillitto, G. P. 519
The numbers of observations needed in experiments leading to a *t*-test of significance of a mean or the difference of two means.
Research, 1948, **1**: 520-5, bibl. 11.
The numbers of observations needed in experiments requiring statistical methods for their interpretation depend on the risks which can be tolerated of reaching two distinct kinds of erroneous conclusions. For the frequently occurring experiments involving simple comparisons of the mean of a sample with a standard value or with the mean of another sample, tables are presented showing the numbers of observations needed in relation to the tolerable risks of the two kinds of error, the precision of the experimental work, and the magnitude of the difference which the experiment is required to detect, if it exists. The use of these tables is illustrated by examples. [Author's summary.]

2351. Wallace, R. H., Bushnell, R. J., and Newcomb, E. H. 537.53: 581.14
The induction of cytogenetic variations by ultrasonic waves.
Science, 1948, **107**: 577-8.
Root tips of *Allium* and *Narcissus* and shoot tips of *Helianthus* were treated in an intense ultrasonic field generated by a piezo-electric instrument with an output of approximately

150 watts acoustic. The vibration frequency used was 400,000/sec. *Helianthus* plants, after having their apical meristems treated in the seedling stage, show definite phenotypic appearances suggestive of genetic changes which are corroborated by cytologic examination of treated root tip material.—Univ. of Connecticut.

2352. KING, L. J. 581.13
A leaf immersion technique for studying the absorption and translocation of chemicals in plants.
Contr. Boyce Thompson Inst., 1948, **15**: 165-71, bibl. 12, illus.
By dipping the undamaged tip of a leaf into the solution. Test plants were maize and tomato.

2353. GULISAŠVILI, V. Z. 581.14: 612.014.44
Breaking dormancy, periodicity of leafing, and rhythmical growth in certain woody plants under artificial lighting. [Russian.]
Priroda (Nature), 1948, No. 3, pp. 63-6, bibl. 13.
A review of the subject, together with the author's own data, for 3-4-year-old seedlings, in relation to some forest and ornamental trees. By artificial lighting it is possible to alter the normal rhythmical development of certain trees, inducing some deciduous trees to become quite or nearly evergreen.

2354. GAUTHERET, R. J. 581.192
Plant tissue culture.
Endeavour, 1948, **7**: 75-9, illus.
Complete success in plant tissue culture was not achieved until 1938. The author describes methods of culture, their use in studying problems of morphogenesis, pathology, and physiology, and their application to research on plant galls.

2355. GALSTON, A. W. 635.31: 581.144.2
On the physiology of root initiation in excised asparagus stem tips.
Amer. J. Bot., 1948, **35**: 281-7, bibl. 15.
Freshly excised sterile asparagus stem tips will form roots readily when exposed to appropriate concentrations of indoleacetic acid (IAA) in the dark. No roots are formed in the light in the presence of the same concentrations of IAA. If stem tips are subcultured for several months in the dark, they lose their ability to root in response to IAA, although stem growth continues. This is interpreted as being due to a depletion of substances involved specifically in root initiation. Depleted stem tips may regain their ability to root in response to IAA in the dark, if they are previously illuminated for 1 week in an IAA-free medium. Neither the amino acids of enzymatically hydrolyzed vitamin-free casein, the vitamins of yeast extract, ammonium sulphate nor various plant extracts can substitute for this light treatment. It is concluded that a material other than auxin, essential for root initiation, is formed in the light, stored in the seed, and depleted by prolonged dark culture. [Author's summary.]—California Institute of Technology, Pasadena.

2356. WAUGH, T. D. 631.535: 581.144.2
Staining of the stem tissue of plants by triphenyltetrazolium chloride.
Science, 1948, **107**: 275, bibl. 7.
Sections of twigs from a number of trees, including fruit trees, required about 4 hours to give a red colour reaction in the cambium layer when placed in a 1% aqueous solution of 2,3,5-triphenyltetrazolium chloride, whereas the cambium of willow sections was stained in one to two minutes. Rose sections did not react until after 24 hours. Biologists are invited to determine whether a relation exists in cuttings between their reaction to the chemical and their readiness to root.

2357. HINE, H. J. 77: 63
Photography in agricultural experiments.
Agriculture, Lond., 1948, **55**: 300-5, bibl. 4, illus.
Some general instructions for photographing the progress of agricultural experiments are followed by descriptions of: the special technique necessary for dealing with field implements in action, photomicrographs for entomological and botanical subjects, soft X-rays for botanical subjects using simple apparatus, the use of miniature films, colour work, infra-red photography. Several possible adaptations to avoid the purchase of expensive apparatus are suggested.

2358. SCHROEDER, C. A. 581.162.3
A convenient plant pollinating kit.
Science, 1948, **107**: 354.
A description and illustration are given of a portable shelf with all necessary technical and " book keeping " equipment attached to it, which has proved very useful in a series of hand pollination experiments on cherimoya.—University of California, Los Angeles.

2359. LOCK, A. C. 632.95
Aerosols in theory and practice.
Aerosols Ltd., London, 65 Old Brompton Road, S.W.7, 2nd edit., 1947, pp. 59, bibl. 110, 3s. 6d.
The fundamental distinction between an aerosol and a spray is in the size of particle involved. In an aerosol the mean particle diameter is about 5μ; such particles are so small that they do not tend to wet objects touched, and so light that they remain in suspension. These and other points are brought out in the first chapter of this book, much of which is devoted to medical applications of aerosols, such as sterilization and inhalation therapy. Horticultural applications are generally confined to work in glasshouses or other confined spaces. The technique is also being used for the disinfestation of fruit trees under tents. The methods of generation of aerosols are discussed.

2360. VAN HAUDENARD, M. 632.95
Aerosols.
Courr. hort., 1948, **10**: 229, illus.
A general account of aerosols, their mode of action, and their use in horticulture.

2361. DEKATOV, N. E. 631.581
Methods for controlling sucker growth in trees and bushes on cultivated areas. [Russian.]
Priroda (Nature), 1947, No. 11, pp. 68-70.
In parts of Russia with insufficient or irregular rainfall it is customary to leave strips of woodland between fields and gardens to maintain fertility. The trees and bushes, however, tend to encroach on the cultivated areas by sending out roots which produce suckers that hinder cultivation. The white acacia is particularly troublesome in this way. Methods described for destroying the suckers involve digging a trench at the border of the woodland strip to sever the roots, and destroying any shoots that may arise from root pieces by spraying them with chlorate of sodium, potassium or calcium. Precautions to be taken when using the chlorates are emphasized.

2362. VAN DEN MUIJZENBERG, E. W. B., AND TREURNIET, P. G. 634/635: 631.2
De tuinbouw-bedrijfsschuur in Berkel en omstreken. **(The horticultural packing shed and store in the Berkel district.)**
Meded. Direct. Tuinb., 1945, **8**: 139-47, 194-203, illus., being *Meded. Inst. Tuinbouwtechn.* **2** [received 1948].
A general account is given of the construction and layout of the building which serves the Dutch nurseryman or market gardener as store, packing shed, and working shelter. The walls are usually made of reed matting, but they may be of weather boarding or, more rarely, of stone. The size and location of the shed are discussed.

2363. COTTENET, J. 631.513
Les explosifs au service de l'agriculture. **(The use of explosives in agriculture.)**
Maison Rustique, Paris, 1948 [?], pp. 134, illus., 120 fr., from review in *Jardins de France*, 1948, **2**: 133.
Of horticultural interest as offering a relatively inexpensive method of making planting holes for trees.

2364. WALKER, J. 631.543.82
Tree planting near dugouts and dams [in Canada].
Publ. Canada Dep. Agric. **629**, 1945, pp. 15, bibl. 15, illus., being *Circ.* **134** [received 1948].
Explains why, where, how and what trees should be planted. There is a section on irrigating gardens.

2365. WILCOX, J. C. 634.1/7-1.41
Soil sampling technique in orchards.
Sci. Agric., 1948, **28**: 321-32.
The results of analyses on soil samples, from apple orchards in the Okanagan Valley in British Columbia, are discussed. Trends with depth of sample were not consistent, and it is recommended that for routine analyses samples should be taken to a depth of at least 24 inches. No seasonal differences were observed for pH, P, K or Ca. Differences in soil composition according to distance from the tree should be taken into account. The high variability of many determinations is noted. J.T.

2366. BROWN, C. A. C. 631.544: 631.588.1
Electrical soil-warming.
Farming, 1948, **2**: 149-51, illus.
A description of the modern low voltage (6 to 30 v.) system as used for hot-beds, propagators, glasshouses and cloches, with some advice on the handling of the simple equipment used. The system, using bare, galvanized, underground wires (usually of 9 or 12 S.W.G.), is generally designed to give a specific loading of from 3·5 to 5 watts per sq. ft. of soil. Estimates of operating costs are given.

2367. ANON. 631.544.4
Experiment with gas.
Fruitgrower, 1948, **106**: 191.
A note on the practical advantages of a thermostatically-controlled, gas-fired boiler for glasshouse heating. Heating is controlled automatically and the problems of fuel storage and stoking do not arise.

2368. DE GUERIN, B. C. 631.544.4
Glasshouse fuel economy.
Fruitgrower, 1948, **106**: 79.
An account of the Blatchford boiler, with three rows of water pipes, and a commercial modification, the Lea, with two rows. With the latter a saving in fuel of 30% is claimed.

Growth substances.

(*See also* 2433-2437, 2475-2483, 2488, 2490m, 2646-2650, 2652-2658, 2660a, 2717-2722, 2745, 2748, 2750, 2765-2767, 2845, 2846, 2877e, f, j, 2885, 2916, 2924, 2928, 2948, 2976, 2998, 3027, 3028, 3125, 3131, 3160.)

2369. RAZUMOVSKIĬ, V. V. 577.17
Growth substances. [Russian.]
Priroda (Nature), 1948, No. 6, pp. 46-8.
A short review of the chemical structure and practical applications of growth substances.

2370. BENSA, S. 635.9: 577.17
Esperimenti con ormoni sintetici applicati a talee e come erbicidi. **(The application of growth substances to cuttings and as weed killers.)** [English summary 9 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 371-81, bibl. 2.
A number of proprietary substances were used successfully to encourage rooting in cuttings of such horticultural plants as carnation, *Thuja orientalis*, *Cineraria* sp. The powder forms incorporated in the soil were successful, being preferable to solutions. No success was achieved with certain named species. "Weedone" proved useful as a herbicide.—Staz. sper. Floric. San Remo.

2371. DUFRENOY, J., AND OTHERS. 577.17
Growth regulating action of salicylacetone.
Growth, 1948, **12**: 157-63, bibl. 6.
Salicylacetone, 4(*o*-hydroxyphenyl)-3-butenone-2, in concentrations of 1 p.p.m. or more, inhibited growth of *Trichophyton mentagrophytes*, a dermatophyte. In concentrations from 4 to 200 p.p.m. it stimulated the development and growth of roots on potato tuber buds and on cuttings of *Ficus gnaptholocarpa*. Dithiobiuret appears to be capable of stimulating the development of leafy shoots on *Ficus gnaptholocarpa*.—Univ. Calif., Coll. Pharmacy, San Francisco.

2372. ENNIS, W. B., Jr. 577.17
Responses of crop plants to O-isopropyl N-phenyl carbamate.
Bot. Gaz., 1948, **109**: 473-93, bibl. 9, illus.
Most of the thirteen monocotyledonous species tested failed to emerge after treatment with O-isopropyl N-phenyl carbamate at the time of sowing; roots and shoots were swollen and, except in a few species which recovered to some degree, failed to elongate. Young established cereals failed to elongate after treatment. Most of the 39 dicotyledonous species treated at germination were unaffected, 6 were affected but recovered, and 9 failed to grow beyond the cotyledon stage. Susceptible dicotyledons included members of the *Solanaceae* and *Cucurbitaceae*, and *Convolvulus* sp. In young potato and tomato plants apical growth was suspended after treatment, the apical bud was inhibited and lateral branches developed. The cytological effects in roots and shoots of treated cereals, involving increases in chromosome numbers, are described. Possible agronomic applications of similar growth substances are discussed.—Camp Detrick, Frederick, Md.

2373. BOSE, S. R., BOSE, A. B., AND DEY, K. L. 577.17: 581.144.2
Effect of crude polyporin on seed germination and root growth: a preliminary study.
Science, 1948, **107**: 63, bibl. 5.
(1) The soaking of gram (*Cicer arietinum*) seed for 24 hours in water containing crude polyporin caused distinct retardation of germination and reduced the number of seedlings emerging. (2) Rings were cut from the outer cortex of branches of guava trees, and the exposed surfaces were treated with crude polyporin for 24 and 48 hours. The branch treated for 24 hours developed two roots and the branch treated for 48 hours six roots after 26 days. No roots were formed in the control branches. In a later experiment *Eugenia jambos* was found to respond to the 48-hour treatment.—Carmichael Medical College, Calcutta.

2374. FREED, V. H. 577.17
Qualitative reaction for 2,4-dichlorophenoxyacetic acid.
Science, 1948, **107**: 98-9, bibl. 6, being *Tech. Pap. Ore. agric. Exp. Stat.* **516**.
A colour reaction is described which may possibly be put on a quantitative basis.

2375. THIMANN, K. V., AND BONNER, W. D., Jr. 577.17
Experiments on the growth and inhibition of isolated plant parts. I. The action of iodoacetate and organic acids on the *Avena* coleoptile.
Amer. J. Bot., 1948, **35**: 271-81, bibl. 17.
Growth measurements were made with sections of *Avena* coleoptile in indoleacetic acid solution; growth was increased by supplying oxygen or allowing the sections to break the surface of the solution. Inhibition of growth by low concentrations of iodoacetate, and the reversal of this

inhibition by certain organic acids, was confirmed. Several of these acids promoted growth in the presence of indole-acetic acid. The growth of young coleoptiles was markedly stimulated by low concentrations of iodoacetate. The implications of these findings are discussed.—Biological Laboratories, Harvard University.

Plant growth phenomena.

2376. WHITE, O. E. 581.14
Fasciation.
Bot. Rev., 1948, **14**: 319-58, bibl. 209.
A review of the literature on fasciation. "The basic cause of fasciation is a disturbed metabolism, involving excessive nutriment which mobilizes energy that must be utilized. This energy, once accumulated, must go into growth, and it becomes 'wildly' expended in extravagant, abnormal and unpredictable tissue production, generally to the detriment of the plant. Various agencies, innate and external, bring this about." Fasciation may be of economic importance, e.g. in tomato fruits, and in inflorescences of cockscomb, *Celosia cristata*.

2377. LOEHWING, W. F. 581.145.1
The developmental physiology of seed plants.
Science, 1948, **107**: 529-33.
An address opening with a discussion of the problems of physiological ontogeny followed by a discourse on the vegetative, flowering and fruiting phases.

2378. WEINTRAUB, R. L., AND PRICE, L. 632.184
Inhibition of plant growth by emanations from oils, varnishes, and woods.
Smithson. misc. Coll., **3912**, 1948, Vol. 107, No. 17, pp. 13, bibl. 45, illus.
Experiments are described from which it is concluded that air in contact with certain oils, varnishes and woods acquired the property of inhibiting or retarding the germination of certain plants, including tomato, bean, lettuce and radish. The inhibition or retardation ceased completely on removal of the seeds from the affected air. As the active agent could be transferred in an air stream from one container to another, it is considered to be of the nature of a chemical vapour rather than some form of radiant energy.

2379. VEIHMEYER, F. J., AND HENDRICKSON, A. H. 631.425: 581.144.2
Soil density and root penetration.
Soil Sci., 1948, **65**: 487-93, bibl. 4.
Results obtained confirm the fact (*H.A.*, 17: 30) that certain soils, when compacted to relatively high densities, do not permit entrance of roots of sunflower plants. Field experiments also show lack of penetration by roots where high densities occur naturally. Thus plants on soils having dense subsoils may be as shallow-rooted as those on typical hardpan soil.

2380. WILSON, J. K. 581.523.4: 631.46
Symbiotic segregation of strains of the root nodule bacteria by leguminous plants.
Mem. Cornell agric. Exp. Stat. **279**, 1948, 23 pp., bibl. 12.
The data obtained from about 200 species of 70 genera of leguminous plants indicate that any one of a number of strains of the root nodule organism (*Rhizobium leguminosarum*) might be isolated from a particular plant.

Nutrition.

2381. WEBB, D. A., AND HART, A. V. 581.9: 631.415
Contributions towards an understanding of the calcicole and calcifuge habit in some Irish plants.
Notes Bot. Sch., Trin. Coll., Dublin, 1947, **5**: 19-28, bibl. 17.
Twenty-two species of plants, of which fifteen were calcicole in their Irish distribution and seven calcifuge, were grown from seed under identical conditions in two artificial soils, one containing calcium carbonate, the other free from it. It is suggested from a discussion of the results that the calcicole habit must be largely determined by differential survival in an environment that is universally unfavourable; but that the balance between environmental and competitive factors must be exceedingly delicate in determining whether the habit be calcicole, calcifuge, or indifferent. The significance of the dryness of most calcareous soils is discussed. No evidence was obtained to suggest that, in any of the species selected for experiment, the concentration of available calcium in the soil is *per se* a major factor in influencing distribution. [From authors' summary.]

2382. SHIRLEY, R. L., AND OTHERS. 581.192: 546.47
Report on zinc in plants.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 285-93, bibl. 3.
The dithizone method for determining zinc in plant materials is discussed. The tabulated data include values for lettuce leaves, dried grapes and dried asparagus.

2383. AUSTIN, C. M., AND MCHARGUE, J. S. 581.192: 546.27
The determination of total boron in plant material with "Chromotrope-B".
J. Ass. off. agric. Chem. Wash., 1948, **31**: 427-31, bibl. 8.
The method is based on the coloured complex or ester of boric acid and "Chromotrope-B" (p-nitrobenzenazo-1,8-dihydroxynaphthalene-3,6-disulphonic acid). For drying, the sample is placed in a coal furnace, the temperature being raised to 600° C. At this temperature the ignition is carried out after the addition of barium hydroxide. The material studied includes bean seed and wild cherry leaves.—Kentucky Agricultural Experiment Station.

2384. HESTER, J. B. 631.8
Proposed method of measuring the movement of soluble fertilizer salts in the soil.
Science, 1948, **107**: 99-100.
A much simplified lysimeter method is described. The data obtained were used to advise growers on the extent of leaching under varying meteorological conditions, thus enabling them to adjust side dressings to actual needs.

2385. PETROSINI, G. 632.954: 631.84
Prove sulla tossicità della diciandiamide nella nutrizione vegetale. **(Tests of the toxicity of dicyandiamide in plant nutrition.)**
Reprinted from *Boll. Soc. ital. Biol. sper.*, 1947, Vol. 23, No. 3, pp. 3, bibl. 14.
The action of dicyandiamide is found to be toxic to germination of seed in beans and of growth generally in other plants such as flax. The substance changes gradually in the soil and loses its toxicity, but the exact nature of the change is at present unknown.

2386. DENNIS, R. W. G. 546.27
Boron and plant life. Part VI. Developments in agriculture and horticulture 1943-46. Reprinted with addition of bibliography from *Fertil. Feed. St. J.*, Aug.-Oct., 1947, Feb.-Mar., 1948, 62 pp., bibl. 298, illus.
A review of recent work on boron in relation to nutrition in cultivated crops. Plants mentioned of interest to horticulturists are garden beet, apple and pear, olive, citrus fruits, grape vine, pecan and walnut, strawberry, fig, blackberry, blueberry, potato, sweet potato, sunflower and lettuce, kok-saghyz and guayule. The relation of boron to infection by parasitic fungi is mentioned and its interrelation with other nutrient elements is discussed.

2387. HAYNES, J. L., AND ROBBINS, W. R. 581.144.2: 631.811.4 + 546.27
Calcium and boron as essential factors in the root environment.
J. Amer. Soc. Agron., 1948, **40**: 795-803, bibl. 7, illus.
Work with tomato plants has shown that both calcium and boron are necessary components of the root environment wherever roots are in contact with water. Several species of crop plants were grown with one portion of the root system in soil and the other portion in a solution consisting of calcium chloride and boric acid in distilled water. In all species tested, both portions of the root systems maintained their functional integrity. The significance of these results with respect to liming practices is discussed. [Authors' summary.]

2388. PEIKERT, F. W., AND COOK, R. L. 631.8: 631.67
Applying fertilizer through irrigation water.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 437-44.
The application of fertilizer through irrigation water is another method which is theoretically sound for nitrogen and potash but not for phosphorus. It seems to be an especially desirable method for applying nitrogen during midseason. It is suggested that a little nitrogen, all the phosphorus and most of the potassium be applied in bands at planting time and that supplementary nitrogen and potassium be applied when tests or observations indicate a need. Fertilizer should be dissolved in water in a barrel or other suitable container and introduced into the pipe line while irrigation water is being applied. If the pump is of the centrifugal type, the solution is taken into the intake line. In the case of a deep-well turbine, the solution must be forced into the discharge line under higher pressure than that developed by the pump. [Authors' summary.]

Sericulture.

(*See also* 2631.)

2389. JANAKIRAM, A. T. 638.2
Introduction of silk industry in the Nilgiris.
Plant. Chron., 1948, **43**: 343-5.
Includes notes on the cultivation of the mulberry for its leaves, quoting yield figures.

2390. CHU, S. L. 634.38: 638.2
A preliminary report on the yield of different varieties of mulberry. [Chinese.]
Nung Pao, 1942, **7**: 34-6, 473-4 [received 1948].
Five common varieties of mulberry were studied. The trees were of equal age and were treated similarly in the experimental farm. The leaves were collected and weighed, results being analysed statistically. One variety was found to be significantly higher in yield. Its vegetative characters are described. Selection work is in progress. H.C.Y.

2391. LI, S. P. 638.2
External morphology of the wild silkworm. [Chinese.]
Nung Pao, 1943, **8**: 7-12, 108-13 [received 1948].
A detailed description is given of the external structure of the larva of the wild silkworm, *Antheraea pernyi* Guer. Changes in both the gross and fine morphological structures during the successive moultings are discussed and compared with that of the ordinary silkworm, *Bombyx mori* L. Food habits and growth rate are also recorded. H.C.Y.

Noted

2392.

a ADOLFSSON, T. 631.62
On the influence of the nature of the pipes on the friction resistance in drainage systems.
Ann. roy. agric. Coll. Sweden, 1947, **14**: 373-89, bibl. 8.

b AUSTIN, C. M., AND MCHARGUE, J. S. 581.192: 546.27
Report on boron in plants.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 284-5.

c CALVIN, M., AND BENSON, A. A. 581.13
The path of carbon in photosynthesis.
Science, 1948, **107**: 476-80, bibl. 18.

d CANADA, DEPARTMENT OF AGRICULTURE. 351.823.1: 634/5(71)
The fruit, vegetables and honey act and regulations (revised 1947).
Dominion Dep. Agric., Ottawa, 1948, pp. 138.

e CARTER, J. F. 631.544
[Concrete cold frames or hotbeds.]
Market Gr. J., 1948, **77**: 7: 9, 32, 34.

f CATALANO, G. 581.144.4 + 581.45
Teoria generale della foglia. **(Everything about all sorts of leaves.)**
Ann. Fac. Agrar. Portici, 1939/40, **12**: 1-4, bibl. 5 [received 1948].

g DENNY, F. E. 581.12
Suggested method for measuring the carbon dioxide production of a large number of simultaneous samples.
Contr. Boyce Thompson Inst., 1948, **15**: 141-51, bibl. 7, illus.

h DONNO, G. 587.36
L'Erythrina crista-galli Lin. Morfologia e biologia fiorale. **(*E. crista-galli*, morphology and floral biology.)**
Ann. Fac. Agrar. Portici, 1939/40, **11**: 82-93, bibl. 21 [received 1948].
Notes on a useful leguminous species.

i FREELAND, R. O. 581.13: 581.49
Photosynthesis in relation to stomatal frequency and distribution.
Plant Physiol., 1948, **23**: 595-600, bibl. 10, illus.

GOIDÀNICH, G., AND CAMICI, L. 633.491
Ipotesi su un caso di metacromasia. Azione del violetto di genziana ammoniacale su elementi cellulari di meristemi cicatriziali nel tubero di patata. **(Theory on a metachromatic phenomenon in wounded potato tuber cells.)** [English summary 1 p.]
Ann. Sper. agrar., 1948, **2** (N.S.): 419-32.—Staz. Pat. veg. Rome.

k HEWITT, E. J. 632.811: 635.1/7
The resolution of the factors in soil acidity: the relative effects of aluminium and manganese toxicities on farm and market garden crops.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 82-96, bibl. 23, illus.

INSTITUTE OF BRITISH AGRICULTURAL ENGINEERS. 634/635: 631.51
Report presented by the study group No. 1 on the type of prime mover to meet the requirements of the horticulturist.
Proc. Inst. Brit. agric. Engrs, 1946, **3**: 180-7, 2s. 6d. [received 1948].

m VAN DER LOEFF, J. A. 632.183
Hout- en wildwallen. **(Planted and natural windbreaks.)**
Landbouwk. Tijdschr., 1948, **60**: 249-56, bibl. 55.
A review, with particular reference to Holland.

n MACDOUGALL, D., AND DELONG, W. A. 581.192
A study of methods for the extraction of nitrogenous material from plants with particular reference to subsequent determination of the lignin content.
Canad. J. Res., 1948, **26**, Sec. B, pp. 457-63, bibl. 8.

A study of the effect of reducing conditions on the amount and nature of lignin isolable from plants.
ibid., pp. 464-7, bibl. 13.
A method for the determination of the lignin content of fresh plant tissue without preliminary drying.
ibid., pp. 468-71, bibl. 13.

o MINISTRY OF AGRICULTURE, LONDON. 631.821
The use of lime in agriculture.
Bull. Minist. Agric. Lond. **35**, 4th Edit., 1948, pp. 22, 6d.

p MUNN, M. T., AND BUCHHOLZ, A. B. 631.531: 635.9 + 635.1/7
The quality of seeds on sale in New York in 1947.
Bull. N. York St. agric. Exp. Stat. **730**, 1948, pp. 46, illus.

q NICHOLAS, D. J. D., AND FIELDING, A. H. 631.416
The use of *Aspergillus niger* (M strain) in the bioassay of magnesium, copper, zinc and molybdenum in soils. I.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 126-37, bibl. 24, illus.

r REINHOLD, J. 631.544
Die Erwärmung von Frühbeeten mittels Pferdemistersatzstoffen. **(The heating of frames with horse dung substitutes.)**
Ceres, Hamburg, 1948, No. 2/4, pp. 19-21, bibl. 17.

s ROBERTS, R. H. 581.145.1: 581.175.11
Blossoming and pigment content.
Plant Physiol., 1948, **23**: 379-87, bibl. 9, illus.
No consistent association.

t STENLID, G. 635.656: 581.144.2
Exudation from excised pea roots as influenced by inorganic ions.
Ann. roy. agric. Coll. Sweden, 1947, **14**: 301-24, bibl. 29.

u WEST VIRGINIA DEPARTMENT OF AGRICULTURE. 351.823.1 (754): 631.531
West Virginia seed law. Regulations and manual.
Bull. (N.S.) W. Va Dep. Agric. **53**, 1947, pp. 21.

v YARDENI, D. 577.17
Human saliva as a germination inhibitor.
Science, 1948, **108**: 62-3, bibl. 4.

TREE FRUITS, DECIDUOUS.

General.

See also 2363, 2389-2391, 3057, 3100, 3121, 3125, 3136, 3137, 3154, 3155, 3158, 3159.)

2393. WELLINGTON, R. 634.1/7
Fruit research—some thoughts, past and future.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 53-8.
This is the text of the first Amos Memorial Lecture given in the Great Hall, Bradbourne, 11 March, 1948. Mr. Wellington, the first director of East Malling, describes the state of commercial fruit culture in Britain before the systematic investigations of fruit tree rootstocks were started, and outlines the results achieved by research. He notes a certain modern inclination to forget fundamental research.

2394. (EAST MALLING RESEARCH STATION.) 633/634(072)
General development and activities. Thirty-five years' work at East Malling Research Station.
Publ. E. Malling Res. Stat. **T6**, 1948, pp. 12, illus.
A short history of this fruit research station followed by notes on present activities and some notable research achievements.

2395. PEARCE, S. C., AND HOBLYN, T. N. 634: 519
A review of experimental design at East Malling, 1919-1947.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 88-100.
Developments in the design of field trials with tree and bush fruits on the East Malling Research Station from 1919 to 1947 are reviewed and illustrated (diagrammatically) by ten experiments chosen as being characteristic of their respective periods. Present recommendations on the lay-out of trials with long-lived fruiting plants are summarized.

2396. MINISTRY OF AGRICULTURE, LONDON. 634.11 + 634.13
Apples and pears.
Bull. Minist. Agric. Lond. **133**, 1948, pp. 119, illus., 3s. 6d.
A few minor amendments have been made in reprinting this bulletin; its contents have been noted already (see *H.A.*, 16: 1783).

2397. BEAKBANE, A. B. 634.11 + 634.13
Intensive methods of apple and pear growing.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 157-64, illus.
Methods of cultivating apples and pears in simple tree forms suitable for the private garden, particularly dwarf pyramids and cordons, are described with the aid of photographs and diagrams.

2398. MINISTRY OF AGRICULTURE, LONDON. 634.22 + 634.23
Plums and cherries.
Bull. Minist. Agric. Lond. **119**, 1948, pp. 74, illus., 2s. 6d.
A comprehensive account of the commercial cultivation of plums and cherries in Britain, on the same lines as the account of apple and pear cultivation given in Bulletin 133 (see *H.A.*, 16: 1783). The longest section (pp. 1-46) deals with all aspects of plum cultivation, but in the section on sweet cherries (pp. 46-69) there are frequent references to details already given in the plum section. Acid cherries are discussed briefly. In addition to the excellent illustrations, there are various diagrams of schemes for interplanting pollinators for self-incompatible varieties and for thinning plantations in stages; there are also tables showing plum and sweet cherry varieties in order of flowering. A fair range of rootstocks is available for plums; suitable and compatible combinations are indicated. As yet comparatively little work has been done on stocks for sweet cherries, which are generally grown as standards in grass; the tendency to change from sheep grazing to mowing is commended. For each crop the control of pests and diseases is described. Other topics discussed include harvesting, storing and marketing, pruning, and orchard improvement and renovation. The bulletin will be of great value to growers with its concise recommendations based on the work of the research stations and observations in commercial orchards; in certain matters growers are advised to keep in touch with the latest developments through the National Agricultural Advisory Service (N.A.A.S.).

2399. NAPOLITAN, L. 634.1/7 (422.3)
The fruitgrowing industry in Kent.
Publ. Dep. Economics, Univ. Bristol, 1947, pp. 223-318, bibl. 27, 5s.
An attempt to investigate the basis and structure of the industry and to gauge the relative importance of the physical,

economic and social factors involved. The limited statistical data available have narrowed the scope of the report, which is presented under the following heads: physical background, soils, statistical survey, distribution of fruit acreage and location of chief fruit areas, types of holding, disposal of fruit crop, role of fruit in the agriculture of Kent, conclusions and recommendations. Amongst the recommendations made are the following: fresh plantings of fruit to be confined to the most suitable soils; a soil survey to be made of possible fruit areas outside the chief fruitgrowing districts; new plantings to be located in " frost free " areas or those reasonably immune from late spring frosts; that the possibility of all fruit growers co-operating in a frost insurance scheme be investigated; new house building to be limited to the poorer soil areas; the grubbing of old and semi-derelict orchards to be continued and intensified; the cultivation of choice pears and small fruit to be encouraged and the area under plums to be made more productive of good quality; discrimination to be made between good and poor quality fruit if prices are controlled; investigations to be made into (1) the possibility of extending the apple juice industry so as to absorb the output of low grade fruit, (2) the desirability of establishing a fruit juice factory in Kent, and (3) the introduction of quick-freeze plant and additional pulp factories; that steps be taken to encourage specialist fruit growing, eliminate inefficient producers, improve marketing organization; that small producers be merged into co-operative enterprises authorized to provide credit facilities, encourage the application of scientific methods, and establish central grading, packing and storage stations; a small tax on output to be levied to finance co-operative organizations; sectional interests to be subordinated to the interest of the fruitgrowing industry as a whole and greater attention to be paid to consumers' requirements.

2400. FOLLEY, R. R. W. 634.1/7(42)-1.16
Home-grown fruit: output and value.
Farm Econ., 1947, **5**: 218-9.
Comparative figures are presented on top and soft fruits grown in England and Wales for the periods 1930-38 and 1939-45, with reference to acreage and to yield and value per acre. Finally, the 1939-45 value is expressed as a percentage of the 1930-38 value. Average returns increased during the second period, largely owing to the grubbing of uneconomic areas and to the coming into bearing of new plantings.—Agricultural Economic Research Institute, University of Oxford.

2401. ENGSBRO, H. 634.1/8(489)
Bedriftskontrollen 1947. **(Fruit statistics 1947 in Denmark.)**
Erhvervsfrugtavl., 1948, **14**: 148-56.
Data are presented on yields of apple varieties and variations in fruit quality, on the occurrence of spray damage in apples, on pest control, and on yields per hectare, soil reaction and soil nutritional status, leaf colour and leaf quantity in 20 Danish apple orchards.

2402. HIEMELEERS, J. 634.1/8(493)
La culture fruitière en Belgique. **(Fruitgrowing in Belgium.)**
Arbres et Fruits, 1948, No. 28, pp. 3-10, illus.
An illustrated account of methods, geography and statistics of Belgian fruit growing. While before the war farmers usually sold their fruit on the tree, leaving the picking to the dealer, most of the growers now harvest their own fruit. The sale of fruit by auction is becoming popular.

2403. COUTANCEAU, R. 634.1/8(44)
L'arboriculture fruitière. **(Fruitgrowing [in France].)**
Rev. hort. Paris, 1948, **120**: 187-94.
A review of fruitgrowing in France, with a discussion of prospects. The future depends on the prosecution and application of research, for which two things are necessary: a supply of graduate workers, and financial assistance from the State.

2404. POWELL, H. R. 634.1/8(941)
The fruit industry in W.A[ustralia].
J. Agric. W. Aust., 1948, **25**: 28-31.
A short account of the fruit industry of Western Australia in relation to the export trade. Granny Smith apples from the State are popular in Singapore. During recent years oranges also have been shipped to Singapore, but they meet very strong competition with mandarins from Siam and China.

2405. HILKENBÄUMER, F., AND HOFFMANN, E. 634.1/8
Über die Intensitätsstufen im Obstbau. **(Degrees of intensity in fruitgrowing.)**
Ceres, Hamburg, 1948, No. 5/6, pp. 1-5, bibl. 3.
Tables show the expenditure of money and labour on various types of top and soft fruit for planting and during the pre-cropping and cropping stages. Cultures requiring a high " labour intensity ", such as cherries and berry fruits, are best run on a family basis, while pome fruit orchards, requiring a high capital investment, are more suitably managed with a permanent labour force.

2406. BARKER, B. T. P., HOBBIS, E. W., AND KEARNS, H. G. H. 663.3: 634.11
The commercial growing of cider fruit in bush tree plantations.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 22-32, bibl. 7.
During the past 50 years there has been a heavy and continuous decline in the total acreage of farm orchards in the West of England. A minimum period of about 25 years must elapse before any substantial addition to fruit supplies could be secured by planting trees of the usual standard type. It is considered that the only practicable method of bringing about a rapid increase in the home production of vintage cider apples is to plant bush trees. It is suggested that bush cider fruit production should be undertaken as a specialized branch of horticulture. While the gross returns per acre from a bush cider plantation will be below those from dessert apple growing, the costs of management, picking, marketing and storage will also be much less. Recommendations are given for the methods of establishment and maintenance of bush cider plantations, including the requirements for pest and disease control. The more important items of equipment for a 40-acre plantation are detailed.

2407. STANTON, W. R. 663.3: 634.11
The production of cider fruit on bush trees: observations on yields, 1941-47.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 32-5, bibl. 5.
An account is given of the cropping of thirty-three varieties of cider apples grown as bush trees at seven centres. The mean cropping capacity of these varieties over a period of six years (6th to 11th year from planting) has been estimated and compared with crop weights obtained at two centres in 1947. The varieties Dabinett, Bulmer's Norman, Yarlington Mill and Reine des Pommes appear suitable for bush culture over a wide range of conditions. [Author's summary.]

2408. BURROUGHS, L. F., AND STANTON, W. R. 663.3: 634.11
Factors affecting juice composition and cider quality of fruit from bush trees. 1. The effect of cover-crop and rootstock on the composition of the juice.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 197-208, bibl. 5.
The apple varieties used in this investigation were Stoke Red, Sweet Alford and Dabinett. The varietal influence was found to be dominant throughout, but cover-crop treatment and/or rootstocks were found to exert a significant effect on

the nitrogen content and total acidity of the juices. Clean cultivation leads to a higher nitrogen content and lower acidity than the other treatments. The crab rootstock induces a higher nitrogen content than the Malling I rootstock. [From authors' summary.]

2409. Gerritsen, C. J. 634.23(492)
Is aanplant van kersen nog verantwoord? (**Is the planting of cherries still justifiable?**)
Tuinbouw, 1948, **3**: 143-8, illus.
The decline in cherry growing relative to that of apples and pears in Holland is attributed to the low prices obtained for cherries in the thirties and the high cost of cultivation and picking. The author discusses remedies, particularly in the direction of planting varieties for successional cropping and in obtaining improved varieties. Nine early varieties are described.

2410. Gerritsen, J. D. 634.22(492)
Over aanplant van pruimen en pruimenonderstammen. (**The cultivation of plums and plum rootstocks.**)
Fruitteelt, 1948, **38**: 468-70.
While the acreages under apples and pears in Holland have increased since 1939, that of plums has decreased. The author sees the reason of this in: (1) Plums require considerable labour in summer for thinning and, later, harvesting. (2) Plums are very susceptible to certain diseases difficult to control, particularly silver leaf and bacterial canker. (3) There are differences of opinion about the use of the newer rootstocks, and nurserymen are not in a position to supply rootstocks required. The rootstock varieties raised in England, Holland, and Germany are referred to, and the yields and vigour of trees of the varieties Ontario, Victoria, Reine Claude d'Althann and R. Cl. d'Oullins on six different rootstocks are compared. The general conclusions drawn are: (i) The two best vigorous rootstocks suitable for permanent trees are Brompton (particularly for Ontario and R. Cl. d'Oullins), and Myrobalan B. (ii) Black Damas C, Pershore and perhaps also St. Julien A are recommended as vigorous rootstocks, for vigorous varieties to form permanent trees and for weak growing varieties as temporary trees. (iii) Rootstocks of medium vigour for temporary trees are Marianna and Common Mussel.

2411. Acquaviva, F. 634.1/2(45)
Lineamenti economici dell'arboreto nell'Alto colle vesuviano e nel Piano campano. (**The economics of fruit growing on the slopes of Vesuvius and the plain beneath.**)
Ann. Fac. Agrar. Portici, 1939/40, **11**: 241-86 [received 1948].
The factual observations made briefly concern two subjects: apricot growing on the slopes of Vesuvius, and apple and pear growing in the plain of Naples.

2412. K[emmer], E. 634.1/2
Strassenobstbau. (**Fruit tree planting for the roadside.**)
Merkbl. Inst. Obstb. Berlin **8**, second edition, 1948, pp. 16, RM. 1.40.
Many country roads in Germany are planted up with fruit trees, often with more than 200 trees per kilometre. The main objects are: to augment fruit supplies, demonstrate training and pruning methods, and to offset the cost of road maintenance. The problems involved are discussed and recommendations are made.

2413. Levy, B. G. 634: 351.823.1
Certification schemes for fruit plants.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 178-81.
A brief description of the certification schemes for black currant, strawberry and raspberry plants and fruit tree rootstocks.

2414. Nederlandse Algemene Keuringsdienst voor Boomkweekerijgewassen. 351.823.1: 634(492)
Reglementen en Voorschriften met betrekking tot de keuring von fruitgewassen en enkele laanboomen. (**Regulations and instructions for the inspection of fruit plants and certain avenue trees.**)
N.A.K.B., The Hague, 1946, 74 pp. [received 1948].
The Dutch public inspection service for arboriculture has issued this brochure for the use of nurserymen and inspectors. It consists of the following sections: (1) Introduction (by the secretary, J. Saathof). (2) General inspection regulations 1946. (3) Inspection instructions for various plants 1946, A. Fruit plants, B. Roadside plants. (4) Regulation regarding required quality 1946. (5) Regulation regarding the personnel of Commissions of Appeal and their duties. The regulations cover the inspection of tree and small fruits (including strawberries) and of poplar and elm.

2415. Anon. 634/635(45)
Il primo convegno nazionale dell'ortofloro-frutticoltura a Firenze. (**Proceedings of the first national assembly of horticulture at Florence, 28 February, 1948.**)
Riv. Ortofrutt. ital., 1948, **32**: 35-44.
The chief interest of these proceedings to outsiders lies in the foundation of a new national pomological society in Italy, namely the "Società Pomologica Nazionale". Its aim is the advancement of every branch of Italian horticulture by selection, research, promotion of economic marketing and all other means in its power.

2416. Riemens, J. M. 631.544: 634.22 + 634.25
De perzik en de pruim in het Zuidhollandse glasdistrict. (**The peach and plum in South Holland glasshouses.**)
Fruitteelt, 1948, **38**: 484-6.
The areas devoted to peach trees under glass in Holland were more than trebled and to plum trees under glass nearly doubled in the years 1944 to 1947. The favourite peach variety is Amsden. The varieties of plum grown are nearly all Golden Japan (64%), June Blood (22%) and Ontario (11%). Manurial tests on peaches were carried out in concrete containers, with varying proportions of N, P and K. The results are described and illustrated. The largest yields were given by the highest applications of K and N.

2417. Cuisance, P. 631.537(44)
La pépinière. (**The nursery.**)
Rev. hort. Paris, 1948, **120**: 183-6.
A review of the nursery industry in France, with general recommendations for the regulation of fruit tree nurseries.

2418. Ilgenfritz, J. I. E. 634.1/2-1.536-1.51
Developments in nursery machinery.
Amer. Nurserym., 1948, **87**: 11: 7-9, illus.
An account of various experimental machines for planting and digging young trees in the nursery.

2419. Gayford, G. W. 634.1/2-1.536
Planting young fruit trees.
J. Dep. Agric. Vict., 1948, **46**: 261-2.
To avoid soil losses from heavy rains, planting trees on "grade" lines with a very slight slope almost approaching the contour has many advantages over the old "square" methods of planting, since it avoids the downrush of water during thunderstorms and retains most of the useful water during the growing season. The use of a planting board, described and illustrated, is recommended.

2420. Terry, H. B. 634.1/2
Treatment of young fruit trees.
Fmg S. Afr., 1948, **23**: 414, 422.
Short advisory notes on planting, attending, and training young deciduous fruit trees in South Africa.

2421. VERNET, A. 634.64(611)
L'olivier et son milieu. **(The olive and its environment.)**
Tunis. agric., 1948, **49**: 83-90.
Soil and climatic factors in the various regions of Tunisia are such as to permit further extensions of olive growing. Potential yields on good soils in the north and south are roughly proportional to rainfall. The possibilities of irrigation are discussed.

2422. CHRÉTIEN, R. 634.64(611)
Les problèmes techniques posés par l'oléiculture dans le Centre et le Sud Tunisien. **(Technical problems in olive growing in Central and South Tunisia.)**
Tunis. agric., 1948, **49**: 91-5.
The writer outlines the problems that must be solved in Tunisia if the local olive growers are to be able to meet world competition. The foremost are: (1) rehabilitation, (2) identification of soils suitable for new plantings, (3) irrigation and fertilizer requirements on light soils with low rainfall, (4) mechanization in connexion with the control of water erosion, and (5) control of wind erosion.

Varieties and breeding.

(*See also* 2349, 2490f, o.)

2423. BROOKS, R. M., AND OLMO, H. P. 634.1/8-1.523
Register of new fruit and nut varieties. List No. 3.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 426-42, bibl. 2.
Very brief notes are given on the origin, parentage (where known), and characters of each variety. There is a list of patented varieties and an alphabetical index of the variety names included in the register.—Univ. of California.

2424. JOUIS, E. 634.1/7
Pomologie et radiesthésie. **(Pomology and divination.)**
C.R. Comité Pomol. Soc. Cent. Hort. Seine-Inférieure, 1947, 14 June, pp. 4-10.
From a study of the literature and correspondence with diviners, the writer concludes that a pomologist who uses a pendulum as an aid to the identification of apple varieties is probably practising self-deception.—Station Agronomique, Rouen.

2425. EINSET, J. 634.11
The occurrence of spontaneous triploids and tetraploids in apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 61-3.
A progress report and summary of polyploid apple material now available at Geneva.

2426. SCARASCIA, G-T. 634.13-1.523
Rilievi genetici su popolazioni ibride di pero. **(Notes on the genetics of hybrid pear populations.)** [English summary 10 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 21-8.
The offspring resulting from the crossing of Bergamotte Esperen with Beurré Clairgeau and of Passe Crassane with Beurré Clairgeau were examined as to size of fruit, shape and time of ripening, colour of peel, and disease resistance of leaves and fruit, the results being set out here.—Ist. Frutt. Elett. Grotta Rossa, Rome.

2427. DONNO, G. 634.13: 581.45
I caratteri morfologici della foglia e la determinazione delle varietà di pero. **(Morphological leaf characters and identification of pear varieties.)**
Ann. Fac. Agrar. Portici, 1939/40, **11**: 94-104, bibl. 8 [received 1948].
In Williams, Abbé Fetel, Beurré Clairgeau, Duchesse d'Angoulême and Doyenne du Comice the most significant differences were found in the general shape of the leaf, its area and the leaf base.

2428. DONNO, G. 634.21
Ricerche sul numero-indice di alcune varietà di albicocco. **(Observations on the number-index of certain apricot varieties.)**
Ann. Fac. Agrar. Portici, 1939/40, **12**: 252-62, bibl. 11 [received 1948].
The number-index is a formula showing the size and relation of different measurements of fruit, kernel and seed. Attempts to use it in identifying apricot varieties were unsuccessful.

2429. DONNO, G. 634.21
I caratteri morfologici del fiore e la determinazione delle varietà di albicocco. **(Flower morphology and identification of apricot varieties.)**
Ann. Fac. Agrar. Portici, 1939/40, **12**: 241-51, bibl. 9, illus. [received 1948].
Examination of the flowers of some 15 apricot varieties indicates the difficulty of identifying apricots by the flowers alone.

2430. M., H. 634.23: 41.312
Ett internationellt missförstånd? **(An international misunderstanding.)**
Fruktodlaren, 1948, No. 2, pp. 49-50.
The name of the French morello cherry variety, Chateau Morelle, was, across the Rhine, gradually changed into the German name Schatten [shade]-morelle. From there it found its way into Sweden as skuggmorellen, "skugg" being the translation of the German "Schatten". The result is that in both Sweden and Germany morello cherries are popularly thought to thrive best in shaded places.

Propagation and rootstocks.

(*See also* 2356, 2370, 2371, 2490n.)

2431. BIRKELAND, C. J. 634.11-1.523
Can unproductive apple seedlings be eliminated from the nursery row?
Proc. Amer. Soc. hort. Sci., 1948, **51**: 123-8, bibl. 4.
Indications are given by work at Urbana, Ill., that eventually a study of the palisade tissue in seedlings may enable the breeder to discard at an early stage those unlikely to satisfy certain standards of vigour and productivity. The technique is not yet wholly evolved.

2432. PIROVANO, A. 634.13: 581.145.2
Su un espediente per mettere a frutto i peri da seme. **(The inducement of early fruiting in seedling pears.)** [English summary 6 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 39-43.
Fruiting was successfully induced in seedlings of Beurré Clairgeau pears by not pruning one of the shoots at the same time as the others but leaving it until the following year when it had reached a height of 1·8 m. Subsequent growth was generally spineless and bore fruit.—Ist. Frutt. Elett. Grotta Rossa, Rome.

2433. HATCHER, E. S. J., AND GARNER, R. J. 577.17: 631.535
A note on the hormone treatment of cuttings.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 182-3.
The use of synthetic hormones as root stimulants in plant propagation is briefly discussed.

2434. HATCHER, E. S. J., AND GARNER, R. J. 577.17: 634.1/2-1.535
Growth substances in their relation to hardwood stem cuttings of fruit tree rootstocks.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 117-20, bibl. 9.
The use of a concentrated dip, to replace older methods of

dust and solution treatment, is described. Results obtained show the different response of Myrobalan B plum and Crab C apple to treatment with β-indolylbutyric acid, and the positive reaction of hardwood apple cuttings to growth substance treatment is established for the first time.

2435. HATCHER, E. S. J. 577.17: 634.11 + 634.22
The study of auxin in shoots of apple and plum.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 113-6, bibl. 4.
A modification of the standard coleoptile method was used for auxin estimation. The relationship between the growth of the shoots and their auxin values is shown and also how the growth pattern of the shoot, with the degree of branching as a criterion, is reflected in the auxin trends. Auxin values are influenced by external conditions, notably the seasonal environment of the shoot.

2436. DE BOER, S. 577.17: 631.535
Proeven met groeistoffen, grondmengsels enz. bij het stekken. **(Tests with growth substances, rooting media, etc., for cuttings.)**
Jaarb. Vereniging "De Proefruin" te Boskoop 1946, pp. 23-48 [received 1948].
An account of further propagation trials with ornamental shrubs and trees, including apples. A summary of trials extending over several years is given in a table, in which the following data are indicated: species, variety, season, medium, optimum growth substance or wounding treatment, reference being made to detailed accounts in the annual reports from 1941 to 1946.

2437. DOTTI, F., AND BRASCA, M. F. 577.17: 631.535
Contributo alla conoscenza dei fitormoni come fattori di radicamento delle talee. **(Growth substances for facilitating rooting in cuttings.)** [English summary 8 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 357-70.
Using Belvitan in paste form, Roche 202 and indole-3-butyric acid the authors obtained their best results with semi-hard wood cuttings of apple, quince, *Aucuba*, *Mahonia*, *Rosa*, vine and *Taxus*.—Staz. sper. Ortifrutt. Milan.

2438. GARNER, R. J., AND HATCHER, E. S. J. 634.22-1.535
Spacing as a factor governing rooting and growth of hardwood cuttings of the Myrobalan B plum rootstock.
J. Pomol., 1947, **23**: 149-66, bibl. 9, illus.
Experiments to investigate the effect of spacing on the growth and form of young plants derived from hardwood cuttings of the Myrobalan B plum, *Prunus cerasifera* Ehrh., rootstock are described. On two soils of contrasting features, a normal loam, and a highly specialized lake-bed soil, close spacing resulted in plants of smaller general size, with reduced branching, without reduction in the percentage establishment of cuttings. Marked effects, due to soil and seasonal climatic conditions, were also observed, the plants on the lake soil being considerably more branched than those on the loam. Irrigation of the loam throughout the growing season failed to produce the much branched form of plant typical of the lake soil. The horticultural value of these effects of spacing is considered. [Authors' summary.]

2439. KEMP, E. E. 631.535
Some aspects of plant propagation by cuttings with special reference to the selection of material.
J. roy. hort. Soc., 1948, **73**: 291-305, illus.
Mainly a discussion of some of the processes which take place within the cutting between the time it is isolated from the parent plant and the production of roots. The subject is dealt with under the heads: selection of material, preparation of cuttings, remarks on rooting media and the handling of rooted cuttings.—Roy. Bot. Gdn, Edinburgh.

2440. TOOLE, E. R. 631.535
Rootability of cuttings.
Amer. Nurserym., 1948, **88**: 2: 72, bibl. 3.
Green shoots produced by root cuttings of mimosa (*Albizzia julibrissin* Durazz.) were removed and set in moist vermiculite without further treatment. They all formed roots. Similar shoots formed on hardwood stem cuttings failed to root under like conditions.

2441. GARNER, R. J., AND HATCHER, E. S. J. 634.11-1.535
The selection of hardwood stem cuttings of an apple rootstock.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 71-5, bibl. 8.
The root formation of apple stem cuttings selected from differing regions of parental plants of differing origin is related to the source of the cuttings. 1. Young parent plants propagated from roots yield more ready-rooting stem cuttings than young parents from shoots. 2. Yearling parents from roots are a better source than two-year parents. The reverse is true of one- and two-year parents propagated from shoot cuttings. 3. Cuttings from the base of yearling shoots are superior to those from the upper part, irrespective of the origin of the parent plant. 4. There is a gradient in rooting ability along a yearling shoot. 5. Heeled cuttings are only superior to straight cuttings because they ensure the inclusion of the true base of the yearling shoot. Large heels are deleterious. [Authors' summary.]

2442. GARNER, R. J. 634.13: 634.14-1.541.11
The nursery behaviour of the Williams' Bon Chrétien pear when worked upon a wide range of quince rootstocks.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 65-70, illus., bibl. 4.
Thirty varieties of quince from various sources were propagated vegetatively, budded with Williams' Bon Chrétien and observed for 3 seasons. This pear variety showed no outstanding preference for any particular quince or group of quinces. A method for recording the pull required to break the graft junction is described, and the apparatus illustrated.

2443. TYDEMAN, H. M. 634.14: 631.541.11
Descriptions of some quince rootstocks.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 59-64, illus., bibl. 5.
Botanical descriptions, with 9 tables of details, are given of some of the more recent additions to the quince collections at East Malling. An account is given of the quinces of Fontenay, Pillnitz and Provence and of some new forms of the Angers. The probable mode of origin of the numerous continental quinces is discussed.

2444. BEAKBANE, A. B. 634.2-1.541.11
An expedition to France to study fruit tree rootstocks, June, 1947.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 76-7.
New rootstocks for fruits of the genus *Prunus* are needed. Field observations made during a collecting expedition to France are here recorded.

2445. RANDHAWA, G. S., AND UPSHALL, W. H. 634.13-1.541.11
Scion rooting in dwarf pear trees.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 129-31, bibl. 4.
Under Vineland, Ont., conditions dwarf pears, Anjou, Bartlett, Bosc, Clapp's Favourite and Vermont Beauty on quince, although planted with the union 6 inches below the ground, did not form scion roots until their 7th to 10th years. The roots then formed did not result in restricted fruiting.

2446. Roach, W. A., and Thompson, E. C. 634.22-1.541
Examination (after injection with a dye) of a double worked plum tree showing incompatibility.
J. Pomol., 1947, **23**: 212-7, bibl. 6, illus.
A double worked plum tree, Victoria/President/Myrobalan B, showing signs of incompatibility in one of its two branches more than in the other, was injected with a dye solution. The framework of the tree was sawn and split to study the distribution of the dye, the structure of the unions and the distribution of heartwood. A visible deterioration of the union was found to correspond with the removal of all the President foliage, but the health of the tree was not affected until all woody tissues formed previous to this had become changed into heartwood, rendering the tree dependent on the later, imperfectly formed part of the union. The transformation to heartwood had progressed further in those tissues in direct connexion with the unhealthy branch than in those supplying the healthy one. [Authors' summary.]—E. Malling Res. Stat., Kent.

2447. Beakbane, A. B., and Thompson, E. C. 634.11: 581.144.2
Anatomical studies of stems and roots of hardy fruit trees. IV. The root structure of some new clonal apple rootstocks budded with Cox's Orange Pippin.
J. Pomol., 1947, **23**: 206-11, bibl. 6, illus.
An account is given of the structure of the roots of 38 new clonal apple rootstocks and of 9 Malling rootstocks used as controls. Data on the percentage of bark in roots of a given size indicated that there was a correlation between this percentage in the roots produced by a given rootstock and the vigour and precocity of the scion grafted on the rootstock. Further data on different sizes of roots indicated that, (I) there was a relationship between root size and percentage bark, and (II) this relationship differed with different rootstocks in that the percentage bark decreased more rapidly with increasing size of root in the vigorous than in the dwarfing rootstocks. The structure of the wood of the rootstock roots, in particular the amount of fibre elements and ray cells, was shown to be related to the vigour and fruitfulness of the scion variety. The percentage area of living tissue in the wood and bark of the root together was found to be related to the vigour and fruitfulness of the scion variety. [Authors' summary.]—E. Malling Res. Stat., Kent.

2448. Komarofski, B. 634.11-1.541.11: 581.43
The wood anatomy of certain apple stock and scion varieties and correlative structural changes in the trunk induced by budding.
Palestine J. Bot. (R), 1947, **6**: 78-87, bibl. 5.
A study undertaken to discover whether anatomical differences exist between stock and scion and whether the scion changes the structure of the stock in the neighbourhood of the union, and *vice versa*. Changes were found to be brought about more often in the scion than in the stock, the latter provoking quantitative structural changes in the xylem body of the scion which render it more similar to the structure of the stock itself. Thus the dwarfing stock E.M. IX, which has a high proportion of pluriserial wood rays and wood parenchyma cells (while libriform fibres are scarce and vessels narrow), exerts an influence of this kind on the scions budded to it. This influence is most pronounced in the width of the vessels. Generally speaking the stock E.M. II is only little affected in its anatomical characters by the various scions budded on it, but Gravenstein which has few, wide vessels, produces a marked decrease in the vascularization of this stock. In the stocks, negative correlations were established between the relative proportion of wood rays on the one hand and the size of the vessels and vegetative vigour on the other.

2449. Hilkenbäumer, F. 634.1-1.541.11
Ursache und Auswirkung der "Freimachung" bei Kernobst. **(Scion-rooting in pome fruits.)**
Züchter, 1946, **17/18**: 50-6, bibl. 12 [received 1948].
The experiments were carried out on 88 pear bush trees (3 varieties) and 832 pear cordon trees (11 varieties), supplemented by observations on 416 apple spindlebush trees (2 varieties) on M. IX rootstock. The following is a slightly abbreviated translation of the author's summary: (1) Scion-rooting is due neither to incompatibility between rootstock and scion nor to the vigour of the variety, but to the hereditary tendency of the variety to form roots. In every case the disproportion between increased nutrient requirements of the variety, due to increased vigour (as the result of pruning), and a limited supply of water and nutrients was the immediate cause of scion-rooting. The insufficient supply of nutrients may be due either to the dwarfing character of the rootstock or to external factors. (2) On the same rootstock and in the same locality individual varieties showed typical differences in the percentage of scion-rooting trees (ranging from 0 to 66%) and in the number and diameter of the roots formed. The behaviour of the same variety in different localities was comparatively uniform. Not a single root was formed in any plant of Triomphe de Vienne. A small percentage of scion-rooting occurred in Winter Forelle, Duchesse d'Angoulême, President Roosevelt, Alexander Lucas and Beurré Hardy; a medium percentage in Beurré Diel and Clapps' Favourite; and a high percentage in Vicar of Winkfield, Louise Bonne de Jersey and Bartlett. There was less scion-rooting in Belle de Boskoop than in Freiherr von Berlepsch. The influence of scion-rooting on the vigour of the scion variety varies greatly. While in Bartlett, Clapps' Favourite and Beurré Hardy trees showed about the same vigour whether they were scion-rooted or were entirely on quince, scion-rooted cordons of Duchesse d'Angoulême, Vicar of Winkfield, President Roosevelt, Beurré Diel and Alexander Lucas were more vigorous than non-scion-rooted trees. (4) Equally, the influence of scion-rooting on yield varied largely. Whereas scion-rooting caused a long delay in bearing in Alexander Lucas and in Duchesse d'Angoulême, it did not produce a significant effect in other varieties. Scion-rooting was found to reduce yields only where it was associated with increased vigour. Influence of scion-rooting on fruit size and fruit colour could not be proved with certainty.—Halle University, Germany.

2450. Thomas, L. A. 634.11-1.541.11
Stock and scion investigations. VI. Further nursery trials with apple rootstocks.
J. Coun. sci. industr. Res. Aust., 1948, **21**: 16-20, bibl. 3.
In the search for apple rootstocks superior to Northern Spy, both local and imported stocks reputedly immune to woolly aphis have been tested with Jonathan as the scion variety. Two techniques were used in establishing the trials: one, by budding the stocks while still growing in the layer bed and then transplanting into permanent positions in the dormant season; the other, by planting the stocks in permanent positions and budding them the following summer. Woolly aphis attacked reputedly resistant stocks. Merton 778 and local selection S4 appear to be desirable improved rootstocks. [Author's summary.]—Stanthorpe, Queensland.

2451. S[iaens], F. 634.1/2-1.532/534
Het aanaarden van fruitboomonderstammen. **(Earthing up fruit tree rootstocks.)**
Cultuur Hand., 1948, **14**: 376-7.
Notes on operations. When the first heavy earthing of plum layer rows is carried out (about 10 April) the shoots should be sprayed with a copper preparation as a protection against *Cylindrocladium scoparium* which causes shoot wilt.

The earthing of apples and quinces is begun about the end of May or in June, but care must be taken at this time not to injure the buds or 20 to 30% damage may be caused, particularly on M. IX rootstock. The soil must be put round the shoots so as not to leave spaces; on brittle varieties, such as IX, this should be done by hand. Later earthings may be done by plough.

Pollination.

(*See also* 2490e, k.)

2452. Pfeiffer, N. E. 634.11: 581.162.3
Effectiveness of certain apple pollen diluents in hand pollination tests.
Contr. Boyce Thompson Inst., 1948, **15**: 119-25, bibl. 10.
Lycopodium powder, Eastern Magnesia 23 talc, and wheat flour used as diluents in equal quantity with Jonathan apple pollen on Stayman Winesap stigmas gave good fruit sets. Other carriers, including another type of talc, were unsatisfactory. The efficacy of other talcs should be investigated, as a fireproof carrier is essential for use in pollen bombs.

2453. Coutaud, J. 634.11: 581.162.3: 575.12(44)
Essais de fécondation artificielle effectués en 1944 sur quelques variétés de pommiers à couteau. **(Artificial fertilization trials carried out in 1944 on some dessert apple varieties.)**
Bull. Soc. bot. Fr., 1946, **93**: 106-10.
The percentage of fruits set as a result of four self-pollinations and 16 cross-pollinations, each involving an average of 60 flowers, are reported. These results show that orchards should contain more than one variety; Reinette de Caux set only 30% fruits when self-pollinated but 87% when fertilized by another diploid variety such as de l'Estre. Pollination of diploids by triploids gave very poor results as compared with pollination by other diploids. [From *Plant Breeding Abstracts*, **18**: 1153, 1948.]

2454. Morettini, A. 634.451: 581.162.3
La influenza della fecondazione dei fiori sulla cascola dei frutti nel Diospiro o Kaki. **(The effect of pollination on fruit fall in the kaki.)** [English summary 10 ll.]
Riv. Ortofrutt. ital., 1948, **32**: 4-13.
The author's observations in Tuscany show that for kaki trees bearing female flowers but infertile stamens hand pollination results in decreased fruit drop and increased yield. The question is debated whether in such cases interplanting with suitable ♂ fertile varieties is desirable owing to the danger of excessive crops being produced and hence of the inducement of biennial bearing. Trials on the subject are desirable.

2455. Schultz, J. H. 634.21: 581.162.3
Self-incompatibility in apricots.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 171-4, bibl. 2.
Perfection and Riland were found to be self-incompatible, Blenheim, Royal, Tilton and Wenatchee Moorpark self-compatible.—Prosser, Wash.

Growth and nutrition.

2456. Roberts, R. H. 634.11: 581.14
Growth and blossoming of some apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 51-3, bibl. 1.
Observations made on the relation of terminal growth to blossom bud formation on individual branches of 8 leading apple varieties in Wisconsin.

2457. Roberts, E. A., Southwick, M. D., and Palmiter, D. H. 634.11-2.95: 581.45
A microchemical examination of McIntosh apple leaves showing relationship of cell wall constituents to penetration of spray solutions.
Plant Physiol., 1948, **23**: 557-9, bibl. 7, illus.
Pectinaceous substances, present in the outer walls of the epidermal cells of McIntosh apple leaves, are responsible for the entrance of water-soluble materials into the leaf. The surface of the leaf is not covered by a continuous layer of cutin.

2458. Kadiura, M. 634.451-1.55
Studies on physiological dropping of fruits in the Japanese persimmon. [Japanese, English summary 2 pp.]
Res. Bull. hort. Exp. Stat. Dep. Agric. Comm. Okitsu **19**, 1944, 300 pp. [received 1948].
Experiments were carried out on kaki trees in pots (*Diospyros kaki*) to study the effect of various factors on fruit drop. Two periods of drop were noted, namely from early June to late July, and from the middle of August to mid-September, the latter on some varieties only, e.g. Yemon and Yokono. This late drop is quite unlike the pre-harvest drop of apples, and seems to be confined to Japanese persimmons. Some varieties are markedly affected by pollination while others are highly parthenocarpic and the influence of pollination on fruit drop is insignificant. Drought appears to have no effect on drop, but ringing, blossom thinning and nitrogenous fertilizers all reduce it. Competition for food materials between new root growth and fruit seems to be the chief cause of late drop.

2459. Trenkle, R. 634.1/2: 581.44
Beziehungen zwischen Zytologie und dem Drehen der Stämme bei Obstbäumen. **(Relations between cytology and twisting of stems in fruit trees.)**
Ceres, Hamburg, 1948, No. 1, pp. 5-8; No. 2, pp. 11-2.
Observations of a large number of fruit trees in Bavaria led the author to the conclusion that both the tendency of the stem to twist and the direction of the twist (left or right) is a varietal character. It is further suggested that in apples and pears left-twisting varieties are diploid and good pollinators, and that right-twisters are bad pollinators, whether triploid or diploid. A long list of varieties is presented in support of this hypothesis. Nine photographs illustrate the twisting of stems.

2460. Kenworthy, A. L., and Gilligan, G. M. 634.25-1.8
Interrelationship between the nutrient content of soil, leaves, and trunk circumference of peach trees.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 209-15, bibl. 11.
Correlations were established in 1946 on peach trees planted in 1941 at Georgetown, Del. They strongly indicate that there is a positive relationship between N, P and K in peach leaves until a certain level of nutrition is reached, beyond which the rate of absorption of K appears to be reduced, while higher levels of P unfavourably affect the absorption of N and tree growth. There are indications that higher K absorption may also depress N absorption. In these sandy soils organic carbon appears to be the most important factor in the possible increase of absorption of other nutrients.

2461. Davis, L. D., and Davis, M. M. 634.25-1.55
Size in canning peaches. The relation between the diameter of cling peaches early in the season and at harvest.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 225-30, bibl. 1.

The peach industry finds an early estimate of harvest size useful. The technique here indicated should prove useful for the purpose.—Davis, Calif.

Manuring and cultural practice.

(*See also* 2365, 2392o.)

2462. Singh, L. B. 634.11-1.8
A test of nitrogen, phosphorus and potassium injections in biennial bearing apple trees.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 82-4.

Injection of N, P and K, alone and in combination into branches of Miller's Seedling, both in "on" and "off" year phases, did not affect subsequent biennial behaviour.

2463. Cain, J. C. 634.11-2.19
Some interrelationships between calcium, magnesium and potassium in one-year-old McIntosh apple trees grown in sand culture.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 1-12.

The idea underlying these trials at Geneva was to learn more on the interrelationships between Ca, Mg and K in apple foliage and to investigate the extent to which the leaf content of these nutrient and deficiency symptoms are affected by one or more of them. Results of analysis and observations are tabulated or portrayed and [somewhat inconclusively] discussed.

2464. Cain, J. C., and Boynton, D. 634.11-1.8
Some effects of season, fruit crop and nitrogen fertilization on the mineral composition of McIntosh apple leaves.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 13-21, bibl. 16.

Data are presented from two New York orchards, differing considerably in soil and climatic conditions, which had received differential application of ammonium sulphate for 4 consecutive years. There were marked decreases in leaf K and P and increases in Ca and Mg and total Ca + Mg + K (*a*) with increase in N applied, (*b*) with advance in growing season, and (*c*) with a heavy crop. There were indications that these changes in mineral composition were partly due to changes in distribution of these minerals within the plant.

2465. Fisher, G., Boynton, D., and Skodvin, K. 634.11-1.84
Nitrogen fertilization of the McIntosh apple with leaf sprays of urea.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 23-32.

In a poor year for fruit setting in 3 McIntosh orchards in Western New York State 3 lb. of urea applied to the soil in early spray was more effective in increasing terminal growth, set and yield of fruit than 3 lb. applied in sprays starting at petal fall, though the spray produced rather better fruit colour. The effect of urea sprays at different times on fruit set and colour was observed and is here recorded.

2466. Beattie, J. M. 634.11-1.84
Carbohydrates in apple shoots and twigs and their relation to nitrogen fertilization, yield, growth and fruit colour.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 33-40.

The results of observations on a block of 23-year-old McIntosh trees in Wayne County, New York, given known nitrogenous applications since 1942, are recorded for 1947 and indicate the possibility of using starch content to determine the nitrogen status of the apple and with other analyses to help in determining the efficiency of nitrogenous manuring.

2467. Trevett, M. F., and Hitz, C. W. 634.11-1.8
Fertility management in Maine orchards.
Ext. Bull. Me agric. Exp. Stat. **381**, 1948, pp., 20 illus.

Recommendations for the management of soils in sod apple orchards in Maine include regular mulching to suppress weeds under the trees, annual application to each tree of 1 lb. of nitrate of soda for every 3 years of its age and of 500 to 700 lb./acre of a 7-7-7 fertilizer between the rows, and the application of magnesium limestone when the soil pH is less than 5·5. Certain deficiency symptoms are described.

2468. Fritzsche, R., and Bryner, W. 634.1/7-1.8
Vorläufiger Bericht über zwei Düngungsversuche mit Obstbäumen. **(A preliminary report on two manurial trials with fruit trees.)**
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 251-5, 265-70.

For several years fruit trees in well cared for plantings in Switzerland have shown signs of exhaustion, ranging from lack of new growth to acute deficiency symptoms. The Wädenswil research station, therefore, decided to carry out manurial trials with apples in two places, which offered the necessary number of comparable 40-45-year-old trees. Soil analyses showed potash deficiency in one locality (Küssnacht), while the nutrient status of the soil appeared satisfactory in the other (Neukirch). Nevertheless, the trees recovered quickly in both places following a specified, "complete" manurial treatment applied by fertilizer lance. In the second year of the experiment, i.e. after two applications of a proprietary fertilizer + ammonium sulphate, treated trees at Neukirch yielded 75 kg., while the controls averaged 33 kg. The percentage of fruit suitable for storage was 94·5 and 71·7, the spoilage in storage amounting to 10% and 39·8% respectively. Good annual growth created the conditions for winter pruning in 1947/48 and a third application by fertilizer lance in spring 1948 resulted in further improvement.

2469. Fagan, F. N. 634.11-1.874
Complete fertilizer feeds cover crops which nourish productive apple trees.
Science for the Farmer, March 1948, pp. 1, 2, 7, being *Supplement* **2** *to Bull.* **488,** *60th A.R. Pa agric. Exp. Stat.*, illus.

A popular account of results from trials with various fertilizers and cover crops in apple orchards.

2470. Davis, M. B., and Hill, H. 634.11-1.4 + 1.8
Orchard soil management and apple nutrition in eastern Canada.
Publ. Dep. Agric. Canada, **802,** being *Tech. Bull. Div. Hort. exp. Farms Serv.* **65,** 1948, pp. 28, bibl. 6, illus.

Although clean cultivation and intercropping may still be desirable while bringing trees into bearing on some soils, sod management with mulching is now generally recommended, particularly on soils liable to erosion, as a less expensive and more efficient method of maintaining soil fertility, organic matter and moisture. Suitable seeds mixtures are discussed, and the results of some experiments are recorded. A large part of this bulletin is devoted to a detailed account, with coloured illustrations, of various deficiency symptoms encountered (or induced in pot culture) in Canada; for each element the remedy is indicated, and the necessity of nutrient balance is stressed. General recommendations are made for the regular application of N, P and K; farmyard manure, supplemented with a quickly available source of N in the spring, may be used in place of a complete NPK fertilizer.

2471. Hendrickson, A. H., and Veihmeyer, F. J. 634.22-1.67
Sizes of prunes as influenced by differences in set and irrigation treatment.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 235-8, bibl. 1.

Trials at Davis, Calif., indicate that in a year of light to

moderate crop the percentage of large fruits cannot be increased by excessive use of water, but may be diminished if the necessary moisture is allowed to become exhausted before the fruits are fully grown.

2472. Jeffries, C. D., and Anthony, R. D. 634.1/8-1.42: 535.33
A mineralogical analysis of some Pennsylvania orchard soils by means of the X-ray spectrometer.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 271-86, bibl. 6.
The principle on which the spectrometer is designed and its essential features are described. Diffraction patterns obtained with it are found to agree with American standard data. The data obtained on the soils examined are considered in some detail.—State College, Pa.

2473. Palmer, E. F., and Van Haarlem, J. R. 634.1/8: 631.4
Orchard soil management.
Bull. Ontario Dep. Agric. **457**, 1948, pp. 50, bibl. in text, illus.
After a general account of the soil and its relation to the plant, methods of increasing organic matter, by means of cover crops, manures or sod culture, are considered. The fruit grower is advised to reduce or abandon soil cultivation for apples, pears and sweet cherries where this is possible. For peaches, plums and sour cherries clean cultivation and green manuring should be continued, but cultivation should be as shallow and infrequent as possible. Recommendations are made on the use of fertilizers.

2474. Anthony, R. D., Farris, N. F., and Clarke, W. S., Jr. 631.874: 634.11
Effects of certain cultural treatments on orchard soil and water losses and on apple tree growth.
Bull. Pa agric. Exp. Stat. **493**, 1948, pp. 16, bibl. 6.
In an apple orchard planted on silt loam in 1927-30, differential soil treatments were started in 1931. Earlier work at the Pennsylvania Station had shown that clean cultivation during two or three summer months has an unfavourable effect on the soil. It was the object of this investigation to determine whether annual cultivation of a much shorter duration could be practised without inducing soil and water losses during periods of high precipitation. In the trials legume and non-legume annual covers, with and without nitrogenous fertilizers, were compared with legume and non-legume sods as to their influence on tree growth and fertility. While the preparation for and the seeding of two cover crops per year were found to cause excessive run-off and erosion, a single cover crop proved to be not detrimental, provided the following precautions were observed. (1) The crop must be sown early so as to be well established at the period of intense rainfall; (2) a complete fertilizer must be applied to guarantee sufficient density of cover, and to avoid competition with the trees. Blue grass and alfalfa sods were entirely satisfactory if properly maintained, i.e. when the nitrogen requirements of the grass and trees were met and an almost pure alfalfa stand was kept up by frequent reseeding. The blue grass had to be disced every 2-3 years to prevent it from becoming too thick. No additional N applications were required in the case of alfalfa. The slope of the orchard should not exceed 6-8%. Data are presented on weights of cover crops, trunk circumference, rainfall and water and soil losses.

2475. Wurgler, W. 577.17: 634.1/7
Sur les traitements contre la chute prématurée des fruits. **(The control of premature fruit drop.)**
Rev. romande Agric. Vitic., 1948, **4**: 55-6, bibl. 4.
The varieties chiefly tested were the apple, Beauty of Bath, and the pear, Bergamotte d'Espéren, the chemical chiefly used being the sodium salt of α-naphthaleneacetic acid. One application of this substance at 10 p.p.m. on 3 July reduced the fruit drop in Beauty of Bath from 44·5% to 6·9% on 16 July and a single application on 9 September reduced the fruit drop in Bergamotte d'Espéren from 46% to 29%. Varieties with a prolonged period of fruit drop require a second treatment 2-3 weeks later, the first spray to be applied immediately before the onset of the trouble. At picking Bergamotte d'Espéren and Conference pears from treated trees were greener than the controls, but the difference disappeared during storage. The chemical proved to delay bud burst and flowering in the following spring in cherries, apples and pears, the data for pears being tabulated. Two varieties of plums did not respond to the treatment.—Lausanne research station.

2476. Vyvyan, M. C., and Barlow, H. W. B. 634.11-1.55: 577.17
Use of sprays to control fruit drop.* II. Effect of adding naphthalene-acetic acid (NAA) to a routine June spray. III. Effect of 2,4-dichlorophenoxy-acetic acid and a related substance on fruit drop in Bramley's Seedling.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 101-7; 108-10, bibl. 3, 6.
Sprays of NAA at 10 p.p.m. applied in late June greatly reduced " June Drop " in Cox's Orange Pippin and increased the crop. It was as effective when added to a spray of lead arsenate or of dispersible sulphur as when applied alone. It had no effect on " June Drop " of Worcester Pearmain, but lead arsenate reduced drop by controlling codling moth. Sprays of NAA reduced drop in Bramley's Seedling whether applied in mid-June or in mid-August. Such sprays are not recommended at present.

2477. Vyvyan, M. C., West, C., and Barlow, H. W. B. 634.13-1.55: 577.17
Use of sprays to control fruit drop. IV. Note on the after-effects of a naphthalene-acetic acid (NAA) spray on the ripening of stored Conference pears.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 111-2, bibl. 5.
From an experiment in which 30 trees were used, arranged in 5 blocks, each consisting of 2 plots of 3 trees, one plot in each block being sprayed with NAA (10 p.p.m.) on 27 August, the other receiving water alone, it was concluded that the spray had no after-effect on storage behaviour of Conference pear, picked a week early, at the normal date, or a week late. Late picking gave the best quality.

2478. Barlow, H. W. B. 634.11-1.55: 577.17
Intensive experimental methods in abscission studies.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 121-5, bibl. 5.
Methods are described for testing growth substances in delaying the abscission of flower-stalks in apple (Cox's Orange Pippin and Bramley's Seedling), and for the quantitative application of lanolin emulsion containing growth substance. The methods are illustrated by experimental data.

2479. Edgerton, L. J., and Hoffman, M. B. 634.11: 577.17
Tests with 2,4-dichlorophenoxyacetic acid for delaying fruit drop of McIntosh.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 67-70.
The ineffectiveness of a 2,4-D spray as compared with a naphthaleneacetic acid spray to check fruit drop in McIntosh led the authors to try injecting the material instead of spraying. When limbs were injected with these substances each proved effective, but 2,4-D much the most. No injury was evident.—Ithaca.

* For first paper in this series see *H.A.*, 17: 1983.

2480. Batjer, L. P., Thompson, A. H., and Gerhardt, F. 634.13: 577.17
A comparison of naphthaleneacetic acid and 2,4-dichlorophenoxyacetic acid sprays for controlling pre-harvest drop of Bartlett pears.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 71-4.
In 3 years experiments in Washington State 2,4-D proved as effective as NAA in reducing drop in Bartlett pears. In one year injury occurred following the use of 2,4-D at a concentration higher than 2½ p.p.m. The possible effect of NAA on ripening is discussed and indications are noted that a concentration of less than 10 p.p.m. may be desirable.—Wenatchee.

2481. Moon, H. H., Regeimbal, L. O., and Harley, C. P. 634.11: 577.17
Effectiveness of different concentrations of 2,4-D as a pre-harvest spray for Stayman Winesap apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 75-6.
In these trials in Maryland the intensity of effect of 2,4-D on fruit drop in Winesap apples was found to be roughly proportional to the concentration used, i.e. 10 p.p.m., 5 p.p.m. and 2·5 p.p.m., corresponding apple drop at a given date being 17·6, 35·2 and 60·5% respectively.—Beltsville.

2482. Batjer, L. P., and Thompson, A. H. 634.11: 577.17
The transmission of effect of naphthaleneacetic acid on apple drop as determined by localized applications.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 77-80.
The limited data from trials at Wenatchee indicate that the foliage is the chief medium for transporting spray stimulus. A noticeable effect of high concentration, 2,400 p.p.m., was early fruit maturity.

2483. Moon, H. H., Regeimbal, L. O., and Harley, C. P. 634.11: 577.17
Some residual effects of sprays containing 2,4-D on apple trees.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 81-4.
The check-to-fruit-drop effect of aeroplane spraying with very high concentration of 2,4-D (8,100 p.p.m. oil emulsion) on 6 November, 1946, was still noticeable at harvest on 23 October, 1947, on Stayman Winesap and Winesap apples. No effect was noticeable on apple varieties not susceptible to 2,4-D spray, e.g. Rome Beauty and Delicious.—Beltsville.

2484. Grainger, A. R. 634.1/2-1.542
Spur pruning of fruit trees.
N.Z. J. Agric., 1948, **76**: 580-1.
A short note recommending more drastic thinning than that usually practised. Typical branches of apple, pear and plum before and after pruning are shown.

2485. Cornuz, L. A. 634.1/2-1.546
Une nouvelle haie fruitière. **(A new fruit hedge.)**
Rev. hort. suisse, 1948, **21**: 250-3, illus.
A clear account of the system of training devised by M. Bouché-Thomas. The trees, spaced from 1·25 to 2·50 m. apart according to variety, stock, and soil, are planted in rows. For pears, quince stocks are used except on poor soils; for apples, M. I, III, or XVI. *First year.*—Strong plants are put in at an angle of 30° to the ground, with alternate stands pointing in opposite directions along the row; the stems are tied where they cross. The oblique planting stimulates the development of water sprouts basally; of these one is chosen on each tree, and the others removed. *Second and third years.*—The first set of water sprouts are now bent back at 120° to the original stems. New water sprouts arising at the base of the first set are similarly selected, and eventually bent in the direction of the original stem. Where these main stems cross they are tied together, no additional support being necessary. The treatment of further water shoots depends on the vigour of the trees. The height of the hedge should not exceed 2 m. Secondary branches should be arched for fruit production, or removed if not required.

2486. Hélye, D. 631.542: 634.1/2
Le cassement. **(Brutting.)**
Rev. hort. Paris, 1948, **120**: 223-5, illus.
Summer pruning of shoots to three buds is liable to force the development of the dormant buds to fresh woody growth. Brutting [half breaking] the shoots causes more moderate development of the dormant buds, and has the desired effect of transforming them into fruiting buds sooner or later. Brutting may be applied, with the same good effect, to pear, apple, quince, peach, apricot, plum, cherry, gooseberry and raspberry. The hanging tip of the shoot remains active. It is removed during winter pruning.

2487. Lécolier, P. 634.1/2-1.546
Courbures et arcures. **(Bending and arching.)**
Rev. hort. Paris, 1948, **120**: 267-9, illus.
The author discusses various methods of training fruit trees based on arching. He favours the form *à la diable*, in which all the more vigorous shoots are forced into fruiting by bending them, no matter where they arise. To obtain first class fruit it is essential to thin if the number of fruit is excessive. This method of training is being used in commercial orchards.

2488. Southwick, F. W., Hoffman, M. B., and Edgerton, L. J. 634.11-1.542.27: 577.17
Further experiences with the chemical thinning of apples and peaches.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 41-7.
By App-L-Set, i.e. the sodium salt of naphthaleneacetic acid(=NaNAA) in Western New York and in the Hudson Valley.

2489. Cravens, M. E., Jr., and Mauch, A. 634.25-1.547.6
Results of experiments on marketing riper peaches.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 387-406
Much of the Michigan peach crop is harvested in the hard-ripe stage to avoid the wastage frequently associated with the marketing of more mature fruits. A cell-type package, designed at the Michigan Agricultural Experiment Station, is described, which affords protection to riper peaches and would thus allow of picking at the firm-ripe to tree-ripe stage. Some problems, including storage and the development of reliable field and packing house tests, will have to be solved, before peaches can be marketed really satisfactorily.

Noted.

2490.

a Barr, C. G. 634.11: 581.192
Investigations on the fluorometric determination of malic and succinic acids in apple tissue.
Plant Physiol., 1948, **23**: 443-54, bibl. 9, being *J. art. Mich. agric. Exp. Stat.* **757**, N.S.

b Brase, K. D. 634.25-1.531
Field nursery tests with newly harvested and one- or two-year stored Lovell peach seed.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 258-62, bibl. 3.
Geneva, N.Y.

c Bryden, J. D. 634.11-1.542
Apple tree pruning systems. Trials at Bathurst Experimental Farm. Value of moderate treatment.
Agric. Gaz. N.S.W., 1948, **59**: 209-11.

d CALHOUN, W., AND SCOTT, F. E. 634: 331
Market prospects for Washington apples and certain other fruits.
Bull. Wash. agric. Exp. Stat. **496,** 1947, pp. 55.

e DESAYMARD, P. 634.1/7: 581.162.3
La mise à fruit des arbres fruitiers. Recherches concernant le pommier. **(Fruit setting in fruit trees. Research concerning the apple.)**
Ann. Inst. nat. agron. Paris, 1947, **34**: 85-202, bibl. 107, illus.
Previously published as thesis, see *H.A.*, 18: 872.

f JAIVENOIS, A. 634.11
La pomme Belle de Boskoop. **(The apple variety Belle de Boskoop.)**
Courr. hort., 1948, **10**: 292-3.

g K[EMMER], E. 634.1/7: 631.584
Betriebswirtschaftliche und physiologische Betrachtungen über die Mischkultur im deutschen Obstbau. **(Economic and physiological reflections on the intercropping of fruit trees in Germany.)**
Merkbl. Inst. Obstb. Berlin **9,** 2nd edition, 1948, pp. 19, RM. 2.—.
For abstract of first edition see *H.A.*, 17: 1237.

h KRAMER, A., AND HAUT, I. C. 664.85.25
Ripeness and color studies with raw and canned peaches.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 219-24, bibl. 10.
Elberta, Summercrest and Halehaven.—College Park, Md.

i LEE, S. H. 634.13
A taxonomic survey of the oriental pears.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 152-6, bibl. 10.

j MIALLET, P. 634.1/8(73)
Quelques problèmes d'arboriculture fruitière aux U.S.A. **(Some fruit growing problems in the U.S.A.)**
Ann. agron. Paris, 1948, **18**: 245-303.

k ROBERTS, R. H., AND STRUCKMEYER, B. E. 634.11: 581.162.3
Notes on pollination with special reference to Delicious and Winesap [in Wisconsin].
Proc. Amer. Soc. hort. Sci., 1948, **51**: 54-60.

l SALLUSTO, F. 634.63(45)
Olivi ed olii della Provincia di Messina. **(Olives and olive oils in the Province of Messina, Italy.)**
Ann. Fac. Agrar. Portici, 1939/40, **11**: 48-72, bibl. 14 [received 1948].

m THOMPSON, A. H., AND BATJER, L. P. 634.11: 577.17
Factors relating to the effectiveness of 2,4-dichlorophenoxyacetic acid sprays for control of the pre-harvest drop of Winesap apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 90-4.
i.e. under North-west conditions.

n UPSHALL, W. H. 634.11: 634.13
Dwarf apple and pear trees in the home garden.
Bull. Ontario Dep. Agric. **456,** 1948, pp. 17, illus.

o VERNER, L. 634.23
The Lamida, Ebony and Spalding sweet cherries.
Circ. Idaho agric. Exp. Stat. **109,** 1946, pp. 4, illus. [received 1948].
New varieties resistant to cracking.

p WEINBERGER, J. H. 634.25: 551.5
Influence of temperature following bloom on fruit development of Elberta peach.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 175-8, bibl. 6.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(*See also* 2342, 2413, 3043, 3044, 3057, 3112, 3147, 3159.)

2491. CADMAN, C. H. 634.711(931)
Some impressions of New Zealand raspberry growing.
A.R. East Malling Res. Stat. for 1947, 1948, **A31,** pp. 173-7.
Raspberries in New Zealand.
Fruitgrower, 1948, **106**: 135-7.
New Zealand raspberries may help us.
Nurseryman and Seedsman, 1948, **167**: 294-9, illus.
Hill system of raspberry planting cuts cost.
Grower, 1948, **30**: 20-1, illus.
An account—much abbreviated in *Grower*—of general impressions of raspberry culture and its associated problems received during a three months' tour of New Zealand, with a map showing the distribution of areas and acreages of raspberries in the Dominion.

2492. BAGENAL, N. B. 634.711
Malling promises better [raspberry] varieties.
Grower, 1948, **30**: 679, 681.
A brief account of some aspects of commercial raspberry growing in Scotland, based on a tour in connexion with the 1948 Conference of the Horticultural Education Association. Preliminary results of a trial including some of the new Malling seedling raspberries are encouraging.

2493. PAINTER, A. C. 634.711-1.523
East Malling raspberries.
A.R. East Malling Res. Stat. for 1947, 1948, **A31,** pp. 171-2.
Abridged descriptions of new raspberries raised at East Malling by N. H. Grubb and already described by him (*H.A.*, 13: 1208; 16: 1848; 18: 152).

2494. CHRISTENSEN, J. R. 634.711: 581.144.2
Root studies. XI. Raspberry root systems.
J. Pomol., 1947, **23**: 218-26, bibl. 10, illus.
Detailed excavations of the root systems of mature plants of the raspberry varieties Norfolk Giant, Newburgh and St. Walfried are described and illustrated. The roots grew at varying depths ranging from 5 to 175 cm. About 70% of the total root weight was in the upper 25 cm. of soil. The maximum root length recorded was 180 cm. Suckers may arise from great depths. Attention is called to the importance of wide separation of plants in variety trials. [Author's summary.]—E. Malling Res. Stat., Kent.

2495. WALDO, G. F., AND DARROW, G. M. 634.714
Origin of the Logan and Mammoth blackberries.
J. Hered., 1948, **39**: 99-107, bibl. 12, illus., being *Tech. Pap. Ore. agric. Exp. Stat.* **518.**
Breeding experiments corroborate suggestions that the loganberry is a cross between an octoploid Californian wild blackberry and a tetraploid European red raspberry; and that the Mammoth berry is a cross between octoploid and tetraploid blackberries.

2496. SCHÜTZ, F. 634.715-1.542
Der Sommerschnitt an Brombeeren (Sorte Theodor Reimers). **(The summer pruning of blackberries; variety Theodor Reimers.)**
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 255-6.
In confirmation of the first year's results (see *ibidem*, 1947, 56: 39-41; *H.A.*, 17: 2013) the most vigorous fruiting

branches with the best quality fruit were again produced on canes, the lateral shoots of which had been cut back completely the previous summer. In view of the mild winter the various treatments tested could not be compared for frost resistance.—Wädenswil Research Station.

2497. SPINKS, G. T. 634.723-1.523
Black currant breeding at Long Ashton.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 35-43, bibl. 3.

As a result of crossing or selfing some of the best cultivated black currant varieties, 22 families represented by some 3,700 seedlings were raised. Subsequent selection and trial resulted in the new named varieties Mendip Cross, Cotswold Cross, and Malvern Cross. Results suggest that no outstanding plants are likely to be produced by "selfing" well-known cultivated varieties, but that large families obtained by crossing such varieties might include seedlings in which a larger number of desirable characters are combined. It seems possible that such combination of qualities might also be found in some of the plants in the second generation raised from these crosses.

2498. BOULD, C., AND CATLOW, E. 634.723-1.8
A manurial experiment on blackcurrants. Progress report II.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 52-8, bibl. 1.

The results of a manurial experiment, for the season 1947, on growth, yield and nitrogen content of the leaves of two varieties of blackcurrants are presented. Treatments had a significant effect on growth, yield of fruit and nitrogen content of the leaf. Composts and stable manure when applied on an equal organic matter basis to 10 tons per acre fresh weight of stable manure did not liberate sufficient available nitrogen for maximum growth and yield of fruit, or maintain an adequate nitrogen status in the leaf. There appears to be relationship between leaf nitrogen content and yield of fruit. [Authors' summary.] See *H.A.*, 17: 2016.

2499. BRYAN, J. D., AND POLLARD, A. 634.723-1.8: 581.192
The effect of manurial treatment on the composition of blackcurrants. Progress report.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 216-21, bibl. 2.

A preliminary study has been made of the effect of organic manurial treatments on the composition of blackcurrants. Estimations of ascorbic acid, sugar and titratable acid in two varieties have shown a relationship to exist between ascorbic acid and sugar levels and nitrogen status of the bush. With increasing nitrogen uptake in the leaf the levels of ascorbic acid and sugar in the fruit are lowered. An increase in the yield of fruit follows the uptake of nitrogen and this more than counterbalances the lower level of ascorbic acid. Thus the total production of ascorbic acid per acre is greatest with the higher nitrogen status of the bush. [Authors' summary.]

2500. JOHNSTON, S. 634.734
The behavior of highbush and lowbush blueberry selections and their hybrids growing on various soils located at different levels.
Tech. Bull. Mich. agric. Exp. Stat. **205**, 1948, pp. 24, bibl. 1, illus.

In 1933, crosses were made between *Vaccinium lamarckii* and *V. australe*, using plants collected in Michigan. In 1940, clonal material of the parents and four hybrids was planted in peat, sand, and a mixture of peat and sand, in boxes set at intervals up a hillside. An account is presented of the growth and yield of the various selections, as influenced by soil and location.

2501. STRONG, W. J. 634.75(713)
The strawberry in Ontario.
Bull. Ontario Dep. Agric. **458**, 1948, pp. 28, illus.

Twenty varieties originating in North America are described, including some recommended for planting in Ontario. Organic matter is of great importance in the preparation of soil for strawberries. Planting systems are described. Owing to the prevalence of pests and diseases, for which control measures are described, the plants are usually ploughed under after a single cropping season. Where a second crop can be obtained, the plantation may be renewed by ploughing part of each row and hoeing the remainder. Irrigation and fertilizers are discussed.

2502. JØRGENSEN, N. 634.75
Jordbaersorter—"Guldgrubens Saga". **(The strawberry variety Goldgrubens Saga.)**
Dansk Havebrug, 1948, **7**: 68.

This "gold mine", has its origin in a cross of Louis Gauthier with a hybrid between Herbstfreude and King Albert. The variety fruits in June, simultaneously with Evern, but new flowers are formed immediately after the harvest, the second harvest beginning about 3-5 August. It is claimed that the berries developing in late summer are of particularly good flavour. Moreover, the runners flower and fruit profusely between the rows of mother plants—distance between rows 1 m.—so that the crop of Goldgrubens Saga is many times that of any other variety [no figures given]. According to the author, considerable areas around Copenhagen have been planted with it.

2503. STATENS FORSØGSVIRKSOMHED FOR PLANTEKULTUR 634.75
Førsog med Jordbaersorter 1945-47.* **(Strawberry variety trials 1945-47.)**
Erhvervsfrugtavl., 1948, **14**: 129-30.

The trials, carried out at the Danish research stations of Virum, Blangsted, Spangsbjerg and Hornum, show very good yields for some of the new Spangsbjerg varieties. For Nr. 516 Spangsbjerg Ydun, for instance, a crop of 276 kg. per 100 m² is recorded, as compared with the two standard varieties, Deutsch Evern, 109 kg., and I. A. Dybdahl, 131 kg. The individual varieties are discussed.

2504. KOBEL, F., AND SCHÜTZ, F. 634.75-1.523
Erdbeer-Neuzüchtungen der Eidg. Versuchsanstalt Wädenswil. **(New strawberry varieties bred at the Wädenswil research station, Switzerland.)**
Gärtnermeister, 1948, **51**: 257.

In addition to the strawberry varieties Wädenswil 1-3, bred earlier by the Swiss research station,† a new variety, Wädenswil 4, has now been released. Its medium-sized to large fruits travel well and were found to be very suitable for canning. The peduncle holds the berries well above the ground, thus rendering strawing superfluous in commercial culture. Other characteristics mentioned in the description are resistance to leaf-spot (*Mycosphaerella fragariae*) and to drought. The prolificacy of Wädenswil 4 will appeal to the home gardener. The complicated pedigree of the new variety is shown diagrammatically.

Vines.

(*See also* 3139.)

2505. (DEPARTMENT OF HORTICULTURE, IOWA.) 634.87(777)
Growing grapes in Iowa.
Bull. Ia agric. Exp. Stat. **P90**, 1948, pp. 987-1000, illus.

The single-stem four-cane Kniffin system of pruning, here described, is particularly suitable for the Concord grape in Iowa. General and detailed information concerning various aspects of grape growing is given.

* The same article, but without the two tables, appeared in *Dansk Havebrug*, 1948, 7: 149 as *Meddel. Statens Forsøgsvirks. Plantekult.* 411.

† For a description of Wädenswil 3 see *H.A.*, 14: 98.

2506. MARIMAN, G. 634.8(493)
Chronique de la viticulture belge en plein air (1947). **(Belgian open-air viticulture in 1947.)**
Courr. hort., 1948, **10**: 222-5, 300-1.
Includes notes on disease and pest control, planting systems, the use of heteroauxins and urine for rooting cuttings, rootstocks, *vinifera* varieties worthy of trial in Belgium, hybrids, new varieties, and the preparation of non-alcoholic grape juice. [At present viticulture in Belgium is largely confined to table grape production under glass round Hoeylaert.]

2507. VENEZIA, M. 634.87
Indagini e prospettive sulle uve da tavola. **(Investigations on table grapes [grown at Conegliano] and their further possibilities.)** [English summary 10 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 221-36, bibl. 7.
Details of time of ripening and of qualities, both organoleptic and analytical, are given for 92 varieties.—Staz. sper. vitic. Conegliano.

2508. COSMO, I. 634.8
I vini rosati nelle Venezie. **(The pink wines of the Venice region.)** [English summary ½ p.]
Ann. Sper. agrar., 1948, **2** (N.S.): 201-20.
A number of vines providing grapes suitable for the production of excellent pink wines are noted.—Staz. sper. vitic. Conegliano.

2509. BRANAS, J. 634.8-1.541.11
Fonctionnement de la section de sélection et de control des bois et plants de vignes en 1947. **(The work of the Section for the selection and control of vine wood and plants in 1947.)**
Prog. agric. vitic., 1948, **129**: 245-54, 285-91, 310-8, 362-5, 381-5.
The fourth annual report of the organization set up in 1944 for improving and maintaining supplies of rootstocks, graft wood, buds, and worked plants of the grapevine in France. It deals with the distribution of rootstocks, their examination in nurseries of various regions, *Vitis vinifera* scion varieties, and new varieties on own roots.

2510. SNYDER, E., AND HARMON, F. N. 634.8-1.541.11
Comparative value of nine rootstocks for ten *vinifera* grape varieties.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 287-94, bibl. 3.
No conspicuous failures or outstanding successes were noted in the fruit and wood weights recorded 1937-1945, the standard stock, Solonis × Othello No. 1613, being as good as or better than the others.—Fresno, Calif.

2511. DIMITROV, P. 634.8: 581.162.3
The relation between pollination and fruitfulness and its significance in breeding the grapevine. [Bulgarian, French summary 8 pp.]
(*Publ.*) *Exp. Inst. Vitic. Wine Prod. Plevna*, Sofia, 1948, 203 pp., bibl. 29.
This is a study of the cause of "millerandage" (production of small berries) in the grape vine. Field pollination experiments on ten varieties are described, (1) on castrated flowers with pollen from one other variety, (2) on castrated flowers with mixed pollen from two or three varieties, (3) on uncastrated flowers with pollen from another variety. Controls were whole inflorescences, and inflorescences with a limited number of flowers left for open pollination. Most of the book is taken up with tables giving the data from these experiments and from pollen germination tests. In general it was found that in all varieties and all tests the percentage of small berries from self-pollination was greater than that obtained by other methods of pollination, thus indicating the advantage of cross-pollination.

2512. DELLENBACH, P. 631.67: 634.8
Des effets de l'irrigation sur la perméabilité des sols irrigués par le Syndicat du Canal d'Irrigation de Canet (Hérault). **(The effects of irrigation on the permeability of soils irrigated by the Syndicat du Canal d'Irrigation de Canet (Herault).)**
Ann. Éc. Agric. Montpellier, 1947, **27**: 315-21.
The 100 hectares irrigated by the Syndicate comprise 50 hectares of vine and 40 hectares of table grapes and fruit. Reduced permeability of the soil, as compared with that obtaining in 1930 when the scheme began to operate, requires an adjustment of the amount of water to be supplied with each irrigation. It is the object of the paper to draw attention to the problems involved in a rational irrigation programme rather than to present a solution of these problems.

2513. COSMO, I. 634.8-1.535
Ricerche sulla correlazione fra topofisi e percentuale di ripresa delle talee di vitigni portinnesti. **(Relation of take of vine rootstock cuttings to original position on vine.)** [English summary 8 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 383-95, bibl. 7.
A review is given of the normal system adopted in Northern Italy for taking vine cuttings for propagation. The importance of the particular position on the mother plant from which the cutting is taken is stressed and it is noted that the best position varies from vine to vine.—Staz. sper. vitic. Conegliano.

Nuts.

(*See also* 2423, 3099, 3145, 3146.)

2514. VASILJČENKO, I. T. 634.51: 581.45
The physiological significance of many-paired leaves in walnut. [Russian.]
Priroda (Nature), 1947, No. 12, pp. 59-60.
The author describes walnut trees bearing leaves with leaflets larger and more numerous than normal. He considers this to be a juvenile or ancient character of the species and suggests that it might be a useful character for the selection of vigorous seedlings.

2515. SMITH, C. L., HAMILTON, J., AND ROMBERG, L. D. 634.521
Specific gravity and percentage of kernel as criteria of filling of pecan nuts.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 157-70, bibl. 4.
Specific gravity alone is not reliable as a criterion, but the present trials indicate that for commercial grading of cured pecans it might be correlated with a standard for each variety and thus result in more uniform grading than is at present accomplished.—Brownwood, Tex.

2516. ESTRADA, M. 634.55(82)
Una zona optima para el almendro. **(The best district for almonds in Argentina.)**
Rev. mens. B.A.P., 1947, **30**: 359: 4-7, 48-50, illus.
The author recounts his own observations in the almond growing regions of California and Spain and describes attempts to establish the industry in Argentina. He concludes that the almond can be successfully cultivated in the mountain zone of the provinces of San Luis and Cordoba, because the frosts are slight, short and irregular, and atmospheric drainage is excellent. Varieties must be selected so that adequate pollination is assured.

Noted.

2517.
a ESAU, K. 634.8: 581.44: 551.5
Phloem structure in the grapevine, and its seasonal changes.
Hilgardia, 1948, **18**: 217-96, bibl. 56, illus.

b HOBBIS, E. W. 634.723
The management and cropping of black-currant plantations at Long Ashton and in the South-West [of England].
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 43-52, bibl. 8, illus.

c JENNY, J. 634.8-1.51-1.588.1
Le travail de la terre au treuil électrique. **(Cultivation with an electric winch.)**
Rev. hort. suisse, 1948, **21**: 249-50, bibl. 5.
Particularly useful on steep slopes in vineyards.

d OLMO, H. P. 634.8
Ruby Cabernet and Emerald Riesling. Two new table-wine grape varieties.
Bull. Calif. agric. Exp. Stat. **704**, 1948, pp. 12, illus.

e OLMO, H. P. 634.8
Perlette and Delight. Two new early maturing seedless table grape varieties.
Bull. Calif. agric. Exp. Stat. **705**, 1948, pp. 8, illus.

f OLMO, H. P. 634.8
Scarlet. A new grape variety for fresh juice and jellies.
Bull. Calif. agric. Exp. Stat. **706**, 1948, pp. 6, illus.

g SHAULIS, N., AND OBERLE, G. D. 634.8-1.542
Some effects of pruning severity and training on Fredonia and Concord grapes.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 263-70, bibl. 5.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

(*See also* 3096, 3125, 3136, 3139, 3160.)

2518. BRITISH MYCOLOGICAL SOCIETY, PLANT PATHOLOGY COMMITTEE. 014: 632.3/4+632.8+632.1
Emendations to the third edition of the list of common British plant diseases.
Trans. Brit. mycol. Soc., 1948, **31**: 340-2.
Since the third edition of the list was published in 1944 (*H.A.*, 15: 364), emendations and additions have become necessary. These are given in the present article together with the number of the page in the third edition where the change or addition should be made. Specific epithets have now been decapitalized. The common names used for virus nomenclature in the *Review of Applied Mycology* (Special Part, vol. 24, part 13, 1946) are accepted.

2519. BRITISH MYCOLOGICAL SOCIETY, PLANT PATHOLOGY COMMITTEE. 632.4: 633.491+634.11
Disease measurement in plant pathology.
Trans. Brit. mycol. Soc., 1948, **31**: 343-5, bibl. 4.
Methods of measuring disease intensity have been laid down for certain diseases of cereals and potato, sugar beet yellows, and apple scab. Notes are given on percentage infection, disease index, and percentage affected leaf-area methods.

2520. LOEST, F. C. 632.1/8
Plant diseases and cultural operations.
Fmg S. Afr., 1948, **23**: 304-7, 324, 383-5.
From the examples given it should be clear that there exists a close relationship between the vegetative vigour of plants and the degree of parasitism of the organism endangering the well-being of such plants, and the inter-dependence and inter-relationship of plants, soil disease, and climate should be apparent. With comparatively few exceptions, the presence of diseases in cultivated crops should be a warning that cultural methods may not be correct, but may constitute the basic cause of such diseases. [From author's conclusion.]

2521. VAN HELL, W. F. 632.3/4(494)
Phytopathology in Switzerland.
Chron. Natur., 1948, **104**: 105-11, bibl. 20.
An account of the fungicides, insecticides, weed killers and growth substances produced by the chemical industry. The work of the Swiss federal experiment stations, technical colleges and universities in the control of pests and diseases is described.

2522. VAN DER PLANK, J. E. 631.543: 632.4
The relation between the size of fields and the spread of plant-disease into them. Part I. Crowd diseases.
Emp. J. exp. Agric., 1948, **16**: 134-42, bibl. 10.
The problem is to determine how making fields larger and correspondingly fewer affects the amount of infection entering them. This paper is confined to a discussion of crowd diseases, which are defined. The first case discussed is that of infection coming into a field from uncultivated plants in the surroundings, as cucumber mosaic virus comes from weeds like *Commelina nudiflora*. As fields are made larger and correspondingly fewer without change of shape or aspect, the amount of infection entering per acre is approximately inversely proportional to the square root of the area of the fields. The second case is that of infection moving from field to field. No generalization is possible other than that the effect of making fields larger and correspondingly fewer on the amount of infection entering unit area of them is greater than in the previous case. Whether the reduction in the amount of infection entering unit area of field can be used to advantage may be judged by the theorem that if disease entering fields can easily be controlled by isolation, it can also be controlled by making the fields larger and proportionately fewer. [From author's summary.]

2523. ESFANDIARI, E. 634.1/2-2.3/4
Diseases of cultivated plants and fruit trees of the subtropical regions of northern Iran. [Iranian with French summary 6½ pp.]
Publ. Trimest. Dep. gen. Prot. Pl. Tehran No. 5, 1947, pp. 1-21, bibl. 7.
Notes of horticultural interest include the following: Pome and stone fruit trees are not abundant in this region because of its subtropical climate, and only in small gardens are pears, apples, peaches, and, rarely, plums and cherries found. Pear scab is frequent in northern Iran and causes important damage. Brown rot (*Monilia fructigena*) was observed on pears, at one place only, where it was causing a loss of 30%; it is not mentioned for apple. Rust (*Tranzschelia pruni-spinosae*) attacks the leaves of plums and apricots, causing severe leaf-drop of the latter, and *Puccinia pruni-spinosae* causes appreciable damage to peach foliage. Bacterial blight (*Pseudomonas juglandis*) attacks leaves and fruit of walnuts, causing severe loss.

2524. WILHELM, S. 634.71.2.4+2.8(794)
Bramble fruits—past and present. Looking at their diseases.
Reprinted from *Calif. Fruit and Grape Gr*, June, 1948, 2 pp.
An account is given of the origin of the brambles grown in California. They are tabulated according to their resistance or susceptibility to dwarfing virus disease, verticillium wilt and orange rust.

2525. DEUTSCHER PFLANZENSCHUTZDIENST. 63(43): 632.9
Organisation des Deutschen Pflanzenschutzdienstes nach den bisher bei dér Biologischen Zentralanstalt für Land- und Forstwirtschaft in Berlin-Dahlem eingelaufenen Meldungen. **(Organization of the German plant protection service according to reports received so far by the Central Biological Institute for agriculture and forestry, Berlin-Dahlem.)**
NachrBl. dtsch. PflSch Dienst, 1947, **1** (N.S.), :6-9
An outline of the organization, with a list of the personnel in the various regions, of the German plant protection service, under the headings: I. The central biological institute for agriculture and forestry; A. Department in Berlin-Dahlem itself; B. Substations outside Berlin. II. The organization of the plant protection service in (1) the Soviet, (2) British-American, and (3) French zones.

2526. " BAYER " PFLANZENSCHUTZ-ABTEILUNG. 632.95: 634.1/8
Höfchen-Briefe für Wissenschaft und Praxis. **(Science letters from the Höfchen station.)**
1948, H.1, pp. 31, Leverkusen, Germany.
The horticultural research station Höfchen was established by the Farbenfabriken Bayer during the recent war, its chief object being to study plant protection problems in fruit, especially apples. One of the " letters ", pp. 4-15, describes lay-out and development of the station, another, pp. 20-5, discusses the application of the insecticide E605 in fruit growing.

Mineral deficiencies.

(*See also* 2382, 2383, 2386, 2387, 2392b, 3121.)

2527. WALLACE, T. 632.19: 634/635
Methods of determining mineral deficiencies in plants.
Chem. Industr., 1948, No. 34, pp. 541-3, bibl. 7.
The paper was read to the Agricultural Section of the Society of Chemical Industry in February, 1948.

2528. WALLACE, T. 632.19: 634.1/8
Soil conditions and mineral deficiencies of plants, with special reference to deficiencies of the trace elements iron, manganese, boron, zinc, copper and molybdenum.
C.R. Congr. Pédol. méditerran., Montpellier and Algiers, 1947 pp. 248-66, bibl. 74, illus.
Among matters discussed in this paper are the effects of cultural methods on the availability of trace elements, and the importance of certain of these elements in fruit growing.

2529. VINEY, R. 634.1/2-2.19
Mineral deficiencies of fruit trees.
N.Z. J. Agric., 1948, **76**: 467-71, bibl. 3.
In experiments carried out in orchards throughout New Zealand definite response has been obtained to methods for diagnosing deficiency disorders. Descriptions are given of the effects of deficiencies of nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, iron, manganese, boron, and zinc. In the Nelson district increasing use is being made of local dolomite for controlling magnesium deficiency of fruit trees. In the Hawke's Bay district experiments are being carried out by spraying stone fruit trees with manganese sulphate to correct a suspected manganese deficiency, with definite response.

2530. MULDER, D. 632.19: 634.1/2
De taal der bladeren als uiting van de voedingstoestand van de vruchtbomen. **(Leaf symptoms as an expression of fruit tree nutrition.)**
Fruitteelt, 1948, **38**: 389-92.
A popular account of leaf symptoms as an expression of deficiency diseases in fruit trees, with particular reference to nitrogen deficiency, lime-induced chlorosis, deficiencies of potassium and magnesium, phosphorus deficiency and excess (the latter resulting in zinc being rendered unavailable), and boron as a trace element in alkaline soils. Some of the symptoms are shown in colour.

2531. KIDSON, E. B. 634.11-2.19
Variation in magnesium and potassium content of individual leaves from mineral-deficient apple shoots.
J. Pomol., 1947, **23**: 178-84, bibl. 6.
Work reported previously has shown that apple leaves of the current season's growth vary in composition with their position on the shoot, and that variations which may occur in the leaves of the same leader are considerably affected by the relative availability of different minerals to the plant as well as by the age of the shoot. Previous analysis figures have been from composite sample. This paper presents figures for individual leaves from a number of leaders, some from trees showing mineral deficiencies, others from trees showing no visible symptoms of deficiency. The percentage MgO and K_2O of individual leaves from the lowest to as high as the 33rd leaf are tabulated and the results discussed.—Cawthron Inst., Nelson, New Zealand. (See *H.A.*, 18: 197.)

2532. WALLACE, T. 634.11-2.19: 631.811.6
Note on the control of magnesium deficiency of apples [in Britain].
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 58-61.
The results of experiments extending over a number of years using soil dressings, solid injections and foliage sprays as remedial measures are summarized and discussed. Data are quoted to illustrate the superiority of foliage sprays over other treatments tried. Results from all experimental centres indicate that where acute magnesium deficiency exists, growers should try the spraying method, using a 2% solution of agricultural Epsom salts + a spreader, giving 4 to 6 fortnightly sprays beginning at petal fall.

2533. BULLOCK, R. M., AND BENSON, N. R. 634.21-2.19: 546.27
Boron deficiency in apricots.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 199-204, bibl. 5.
During recent years, fruit malformations of apricots making the fruit unmarketable have become increasingly evident in the Wenatchee area of Washington. These malformations occur as three distinct symptoms: (*a*) Internal browning and corky tissue developing in the stone area. (*b*) Cracking of the fruit. (*c*) Shrivelling, surface browning, and constrictions of fruit. Field applications of ½ lb. borax per tree have corrected all three symptoms. Boron content of apricot leaves does not fluctuate as widely as that of the fruit. [Authors' summary.]

2534. HANSEN, C. J. 634.22-2.19: 546.27: 631.541.11
Influence of the rootstock on injury from excess boron in French (Agen) prune and President plum.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 239-44, bibl. 2.
Trials with almond, myrobalan, apricot, and marianna rootstocks worked with European plum scions in soils having excessive boron content, show a considerable difference in effect on toxicity of the different stocks. It is suggested that in such soils almond roots are preferable where other conditions are favourable, or myrobalan if the soil is too heavy or wet for almond.

2535. OVERLEY, F. L., AND ALLMENDINGER, D. F. 664.85.13: 632.19
The effect of sulfur and sulfuric acid applications upon soil pH values and cork spot development of Beurré d'Anjou pears.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 119-22, bibl. 10.

The application of neither 70 millilitres of concentrated sulphuric acid per square foot over a period of 6 years nor of 1 lb. of sulphur per square foot affected the incidence of cork spot in Beurré d'Anjou pears.

2536. L.L. 632.19: 634.2
Gommose et incision. **(Gummosis control by incision.)**
Arbres et Fruits, 1948, No. 29, pp. 25-8.
In a case where pathogens and mineral deficiencies could be excluded as causes of gummosis in 20- to 25-year-old, vigorous cherry and plum trees, the following surgical treatment was applied: a fine incision was made into the bark (not cutting into the tissue beneath it) along the length of the stem and in many cases extending to the main limbs. While at first the cut was hardly visible, it was about 4 mm. wide after a week and about 9 mm. wide after a month. This seems to indicate that the bark prevented the internal tissues from expanding. After 4-5 months the trouble was cured.

2537. MEZZETTI, A. 634.451-2.19
Notizie su di una nuova malattia del kaki diffusa in Italia. **(A new disease of kaki widespread in Italy.)** [English summary 5 ll.]
Ann. Sper. agrar., 1947, **1** (N.S.): 425-30.
Symptoms include blackening of leaf veins, leaf chlorosis, and necrosis of wood and of bark.—Staz. Pat. veg. Rome.

2538. GOIDÀNICH, G. 634.25-2.19
Deperimentie mortalità dei peschi in rapporto a necrosi del floema e degenerazione del cambio nella Venezia Giulia. **(Decline and death of peaches marked by phloem necrosis and cambium degeneration in Venezia Giulia.)** [English summary 1 p.]
Ann. Sper. agrar., 1947, **1** (N.S.): 395-424, bibl. 27.
As a first symptom peach leaves lose colour and show red stripes, especially along the nerves. Later they dry up. Rosette formation occurs generally at the ends of the twigs. At first the bark appears to be normal but later depressions are noticeable. These give rise to splits whence gum is exuded. In the most serious cases the whole crown may dry up. Internally the inner bark turns a reddish-brown. Microscopic examination shows degeneration of the cambium. The disease is not parasitic and experiments aimed at its control should include trials of the effect of zinc and boron salts.

Climatic and seasonal factors.

(*See also* 2392m.)

2539. SHUTAK, V., AND SCHRADER, A. L. 634.11-2.19
Factors associated with skin-cracking of York Imperial apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 245-57, bibl. 8.
The red side of the fruit, which is less subject to skin-cracking, possessed thin, regular cutin and showed little distortion of the epidermal and sub-epidermal layers of cells. The cutin on the green side was thick and irregular, and the epidermal and sub-epidermal layers of cells showed much distortion. A significant positive correlation was found to exist between thickness of cutin and the percentage of cracked fruits on a given tree. Trees with heavy crops were less susceptible to skin-cracking. Biennial bearing had a definite relation to skin-cracking. A higher percentage of cracked fruit was found in the " off " year than in the " on " year. Small, highly finished fruit with a deep green ground colour was less susceptible to skin-cracking. The yellow or yellowish-green part of the fruit was the most susceptible to skin-cracking, the green part was next and the red side was the least affected. Most of the skin-cracking was found to be perpendicular to the axis of the greatest fruit growth. Fruits on highly vigorous trees were less susceptible to skin-cracking. The terminal growth and foliage development were inversely related to the percentage of cracked fruit. [From authors' summary.]—Western Maryland.

2540. LAMMERT, W. 632.118: 551.571
Rain shadow.
Met. Mag., 1948, **77**: 206, illus.
The writer recorded greatly reduced rainfalls in the lee of a row of poplar trees near Hanover. In 1947 gooseberries and raspberries suffered from drought for this reason. [The rain shadow must accentuate the well-known effects of removal of soil moisture by a living windbreak.]

2541. PRESTON, A. P. 551.576: 632.111
A fog in March—a frost in May ?
A.R. East Malling Res. Stat. for 1947, 1948, **A31,** pp. 169-70.
The meteorological records at the Research Station fail to support the saying that fog in March is followed by frost in May.

2542. MODLIBOWSKA, I., AND MONTGOMERY, H. B. S. 634.1/2-2.111
Winter injury in 1947.
A.R. East Malling Res. Stat. for 1947, 1948, **A31,** pp. 165-8, illus.
Notes (with 4 plates) on injury to fruit trees (pome, stone and small fruits) observed after the long, cold, snowy period from January to March, 1947.

2543. SINGH, L. B. 634.11-2.111
Winter injury to apple shoots and spurs in relation to previous cropping.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 78-81, illus., bibl. 12.
During the severe winter 1946-47 shoots of trees in the " off " year were more injured than those of trees in the " on " year. Frost injury to shoots was found to be negatively correlated with their length and positively with their diameter. Spurs and shoots react differently to frost. Bourses were more injured on the " on " than on the " off " year trees, while there was no significant difference between dards in " on " and " off " years. The results are discussed in relation to time of defoliation and degree of maturity of shoots and spurs.

2544. BREVIGLIERI, N. 634.25-2.111
Osservazioni sulla cascola preantesi e sui danni delle gelate al pesco nella primavera 1948. **(Observations on pre-floral bud drop and on frost damage sustained by peaches in the spring of 1948.)** [English summary ¾ p.]
Riv. ortofrutt. ital., 1948, **32**: 69-87, bibl. 6, illus.
Mild weather in the early part of the winter in Tuscany was followed by much more severe weather in January to March characterized by sudden fluctuations in temperature in the 24 hours. The system of pruning did not appear greatly to affect the damage sustained. Detailed reference is made to the internal injury sustained by flowers and incipient fruits in the frosts of 28-31 March when frosts of nearly 7° F. were experienced.

2545. HÅRDH, H. J. E. 634.7-2.111(471.1)
Talven tuhot hedelmäpuissa ja marjapensaissa vuonna 1947. **(Winter injury to fruit trees and small fruit [in Finland] in 1947.)** [English summary ¾ p.]
Maataloust. Aikakausk., 1948, **20**: 1-7, bibl. 8.
The winter frost of 1946/47 killed or injured 10-75%—according to district—of the fruit trees and 75-80% of gooseberries, currants and raspberries in the best fruit growing districts of Finland. The boundary of the area, in which damage was general, coincided with the line to the

west and south-west of which the depth of snow on 15 March, 1947, was 30 cm. or less. The injuries to the trees, which are described in some detail, were caused chiefly by drought as the result of the roots being in frozen soil as late as June. In summer, when water was again available, damage to the vascular system of the bark interfered with normal sap flow. Total losses caused by winter injury are estimated to amount to 20-25% of the 1947 crop. See also *H.A.*, 18: 1737.—Agric. exp. Stat. Tikkurila.

2546. KING, H. W. 632.111.3(94): 634.1/8
Frost control in the Australian dried fruit areas.
Publ. Aust. Dried Fruits Ass., 1948, pp. 54, bibl. 17, illus.

A report of a conference held in Mildura, Victoria, in August, 1946, to discuss methods of preventing frost damage. Australian and overseas conceptions of methods to be taken for avoiding such damage in vineyards, orchards and gardens are also reviewed. The subject is treated under the following main heads: Conference recommendations, frost control methods used in Australia and overseas, principles of frost phenomena, ameliorating factors, meteorological and Frost Club services, overseas frost control conceptions, additional investigations. The following are amongst the points brought out in the recommendations: the value of irrigation in alleviating the frost risk, that any form of soil disturbance increased the possibility of frost damage, that standing cover crops increased the frost risk, that the sprouting of grape vines can be retarded by late pruning without adversely affecting yields.

2547. KING, H. W. 632.111.3(94): 634.1/8
Frost control: heat conservation practices recommended.
Citrus News, 1948, **24**: 119.

These recommendations resulted from the 1936 and 1946 conferences of the Australian Dried Fruits Association and concern irrigation and cultivation practices, cover crops, height of vine trellis, weeds, and late pruning of vines.

2548. LEIRI, F. 632.111.3
Nya synpunkter beträffande nattfrosten jämte förslag till ett nytt förfarande för dess bekämpande. **(A new theory of night frost and a new method for its control.)**
Akademiska Bokhandeln, Helsingfors, 1947, pp. 16, bibl. 8.

Briefly, the author's theory is that the formation of ozone in the bottom layers of the atmosphere in the dark, as a result of solar activity, is chiefly responsible for spring frost damage to plants. Being an endothermic process, ozone formation on a big scale is supposed to cause a dangerous drop in temperature and thereby the formation of ice in plant cells. When the ozone molecules are broken up in the morning light, the heat suddenly liberated in this exothermic process causes the scorching injury in the frozen tissues characteristic of frost damage. The remedy would lie in the prevention of ozone formation during the night by radiating heat or light. Experiment must determine the most suitable wave length and source of light for the purpose.

2549. REDLICH, F. 632.111: 634.1/8
Further trials of horizontal fans for the protection of orchards from frost damage.
Rep. Coun. sci. industr. Res. Aust., Div. Aeronautics, **A54**, 1948, pp. 50, bibl. 5, illus.

Trials with horizontal fans to protect orchards from frost damage were initiated in 1946 and continued and extended during 1947, an unusually mild year with no damaging frosts. The indications from the later results is that a 21 ft. diameter horizontal fan may give protection to an area of 3 acres or more for a power expenditure of about 5 h.p. per acre. Extensive measurements of the temperature inversion under typical radiation conditions are recorded and discussed. A description of the radiation frost conditions and a summary of available information on wind machines are included. [See also *H.A.*, 17: 2078.]

Viruses.

2550. KUNKEL, L. O. 632.8
Virus diseases of plants. What they are and how they differ from fungus diseases.
Circ. Bull. Mich. agric. Exp. Stat. **208**, 1947, 19 pp., bibl. 19.

A general account for fruitgrowers, with striking photographs, and with maps showing the distribution of six peach virus diseases in the United States.

2551. RYŽKOV (RISCHKOV), V. L. 632.8
The problem of a natural system of viruses. [Russian, English summary ½ p.]
J. gen. Biol., 1947, **8**: 169-82.

The present classification of viruses, based on symptoms, is criticized. The ecological-geographical characters of a species are particularly important. The group of stolbur yellows is a good example of a genus with many species occupying different areas of distribution; this group includes aster yellows, the false-blossom of *Vaccinium macrocarpon*, tomato stolbur (big bud) and other related diseases.

2552. LINDNER, R. C. 632.8
A rapid chemical test for some plant virus diseases.
Science, 1948, **107**: 17-9, bibl. 2, being *Sci. Pap.* Wash. agric. Exp. Stat. **743**

It was found that an alkaline extract of virus-infected peach and sweet cherry leaves produced a brilliant red colour, if heated with the following reagent: 40 g. sodium hydroxide, 0·3 g. cupric sulphate, 3 g. sodium citrate and 1,000 ml. distilled water. Later a procedure was developed which allowed one to distinguish not only between different virus diseases of the same host but also between different forms of the same disease. A table indicates the colour reactions associated with 6 cherry and 8 peach virus diseases. Preliminary studies suggest that the test can be applied also to virus diseases of apple, apricot, raspberry, strawberry and blueberry. Samples were taken from the mid-lamina portions of leaves. In the case of sweet cherry, spur leaves only should be used.

2553. MILBRATH, J. A., AND ZELLER, S. M. 634.23-2.8
Indexing fruit trees for virus.
Amer. Nurserym., 1948, **88**: 5: 7-8, illus.

The virus content of apparently healthy cherry trees can be determined by grafting on to susceptible test plants. In establishing blocks of virus-free trees it is essential to confirm that the stocks are also virus-free; some of the latent viruses are transmitted by seed.—Oregon State College, Corvallis, Ore.

2554. CROWDY, S. H., AND FORSHAW, J. E. 634.11-2.8
A newly recorded bark disease of apple.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 156-7, illus.

A preliminary account of the symptoms of an unnamed disease first seen on a single tree in Somerset about 15 years ago. Nothing is known of the etiology of the disease, and the nature of the symptoms offer little ground for speculation, since hyperplastic malformations are known to occur in the absence of a pathogen. Its distribution suggests that it is infectious. Should it become widespread it would cause considerable damage.

2555. SCURTI, J. 634.11-2.19-2.8
Sulla pseudosuberosi delle mele. **(Pseudosuberosis of apples.)** [English summary 13 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 247-53.

A new disease on certain apple varieties is described. It is seen on the fruit, on which at first a mark like a fingerprint occurs. The peel turns brown and the flesh becomes leathery and spongy and also turns brown. The apples fall. The microscope shows bodies in the infected zone which suggest a virus and there are indications that this and boron deficiency may be responsible.—Staz. chim. agrar. Sper. Turin.

2556. PARKER, K. G., AND PALMITER, D. H. 634.23-2.8
X-disease on sour cherry in New York.
Plant Dis. Reptr, 1948, **32**: 188-90.
This is a more detailed description of a disease previously noted (*H.A.*, 18: 960). On severely affected trees or branches, particularly of English Morello, all fruit may drop within a few days after petal fall. A part or all of the fruit that persists fails to mature. The affected fruit is small, pink to nearly white, often pointed, and insipid or slightly bitter.

2557. GIGANTE, R. 634.25-2.8
Il mosaico del pesco. **(Peach mosaic.)**
Ann. Sper. agrar., 1948, **2** (N.S.): 407-16, bibl. 20.
The incidence is recorded in Italy of a peach mosaic unknown previously in Italy on a French variety, Précoce argentée. The symptoms are yellowish areas on both old and young leaves. The chlorotic areas may extend over a great part of the leaf blade, but are thinner than those in ordinary peach mosaic. The disease is transmissible by grafting but not by seed. It did not attack Italian peach varieties under natural conditions.—Staz. Pat. veg. Roma.

2558. PRENTICE, I. W. 634.75-2.8
Resolution of strawberry virus complexes. II. Virus 2 (mild yellow-edge virus).
Ann. appl. Biol., 1948, **35**: 279-89, bibl. 12, illus.
Aphids (*Capitophorus fragariae* Theob.), allowed to feed for several days on a strawberry plant infected with yellow-edge, transmitted two virus fractions: one (virus 1) has been described previously (*H.A.*, 16: 1890, 1891); the other (virus 2) was separated by transferring the aphids to fresh indicators after 24 hours. On *Fragaria vesca* virus 2 produced chlorotic spotting, slight marginal chlorosis of the leaves and slight cupping of the leaflets, on Royal Sovereign slight chlorosis of the young leaves. On Royal Sovereign viruses 1 and 2 together produced symptoms of yellow-edge which is thus shown to be caused by a virus complex which can be resolved by means of the aphis vector. —East Malling Research Station, Kent.

2559. BRANAS, J. 634.8-2.8
Assainissement des sols infectés par la dégénérescence infectieuse. **(Disinfecting soils infested with court-noué.)**
Prog. agric. vitic., 1948, **129**: 353-4.
Reference is made to a method of destroying vine roots in soils that have borne vines infected with court-noué. The procedure is as follows: (1) Cut back, in October, the stems of the vines to be grubbed below the union, making a clean cut. (2) Then paint the cut surface three or four times with either a saturated solution of sodium chlorate or pure 2,4-dichlorophenoxyacetic acid. (3) Dig out the dead roots the following summer. (4) Replant with healthy plants the next spring.

Bacteria.

2560. HALLEMANS, A. 632.314: 634.23 +634.22
Bacteriekanker van kerselaars en pruimelaars. **(Bacterial canker of cherry and plum plantations.)**
Cultuur Hand., 1948, **14**: 377-8.
In Belgium bacterial canker (*Pseudomonas mors-prunorum* and *P. prunicola*) is of local distribution but in places it may be important, e.g. in Limburg. The symptoms are outlined. Spraying with bordeaux mixture, as practised in England and Holland, is discussed, and the use of mercury-containing preparations is suggested. Rich soil with a high water table favours the disease. Young trees are susceptible during their first 10 to 15 years. Dressings of lime are recommended, but potash and nitrogenous manures should be applied moderately. Pruning should be avoided during autumn and winter. The use of resistant stem varieties as recommended in England is referred to. Particularly susceptible varieties are the plums Ontario and Victoria and the cherry Early Rivers.

2561. THOMAS, W., MACK, W. B., AND FAGAN, F. N. 634.23-2.314
Foliar diagnosis: comparison of diseased and healthy leaves from the same tree in a peach orchard infected with *Bacterium pruni*.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 179-82, bibl. 6.
Observations of workers of State College, Pa, indicate the necessity for taking healthy leaves when making comparative leaf diagnoses.

2562. THOMAS, W., MACK, W. B., AND FAGAN, F. N. 634.23-2.314
Foliar diagnosis: nutritional factors in relation to bacterial leaf spot of peach.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 183-90, bibl. 10.
Leaf analysis of peach trees showing symptoms of *Bacterium pruni* infection showed that K content increased with the severity of the disease symptoms, while Ca tended to diminish. No relationship was found between the content of the remaining 8 nutrients analysed and severity of disease symptoms, though the ratios of K_2O/N and of Fe/Mn increased regularly with degree of infection. These and other phenomena are discussed.

Fungi.

(*See also* 2451.)

2563. LOUW, A. J. 632.42: 634.11(687.11)
The incidence and economic importance of apple scab [*Venturia inaequalis* (Cke.)Wint.] in the winter-rainfall area of the Cape Province.
Sci. Bull. S. Afr. Dep. Agric. **274**, 1947, 13 pp., bibl. 20.
It is estimated that apple scab is responsible for an annual loss of more than £150,000 in the Union of South Africa. Data on its incidence in relation to certain meteorological conditions in different parts of the winter-rainfall area during the period 1941-42 indicate a correlation between mean temperatures and the incidence of the disease, while the seasonal severity of scab is not always in proportion to the rainfall during the spring months. The more important commercial apple varieties are grouped according to their relative liability to infection under natural conditions. These differences in susceptibility are ascribed to klendusity (ability of a susceptible plant to avoid infection) of some of the varieties rather than to actual resistance.

2564. SIAENS, F. 632.42: 634.11 +634.13
La tavelure apres la floraison. **(Scab after blossoming.)**
Courr. hort., 1948, **10**: 291-2.
A consideration of the factors conducive to scab infection on pear and apple trees after blossoming. Control measures for obtaining the best results are those made (1) before a period of rain which might induce new attack, (2) during pauses in long rainy periods, (3) after rain sufficiently long to create a critical period.

2565. DUNEGAN, J. C., GOLDSWORTHY, M. C., AND WILSON, R. A. 634.11-2.4
Ferric dimethyl dithiocarbamate—a satisfactory material for the control of the apple blotch fungus.
Plant Dis. Reptr, 1948, **32**: 135-7, bibl. 2.

In an experiment on Duchess of Oldenburg apple trees, for the control of apple blotch (*Phyllosticta solitaria*), ferric dimethyl dithiocarbamate controlled the fungus without russeting the fruit or scorching the leaves. Under the trade names of Fermate and Karbam Black it can be used to replace bordeaux mixture. It has the disadvantage of leaving a conspicuous dark residue on light-coloured fruit, but it is easily removed by brushing and seems to cause no permanent injury to the surface of the fruit.

2566. CROWDY, S. H. 634.11-2.4
A progress report on the effect of certain organic acids on the growth of *Nectria galligena*.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 158-63, bibl. 6.

The object was to study the effect of stimulating the growth of host tissue as a possible treatment for canker of the apple. The immediate object was to classify a number of acids in order of their toxicity to *N. galligena*. It would appear from the results of the subsequent field trials that, within the limits of toxicity of the plant growth substances used, healing depends more on the stimulation of the callus than on the suppression of the pathogen, though the 10% Cryptonol treatment suggests that suppression of the pathogen can produce an essentially similar effect, even though the compound does not appear to stimulate callus formation.

2567. LEWIS, F. H., AND GROVES, A. B. 632.42: 634.23
Control of cherry leaf spot in the Cumberland-Shenandoah Valley.
Bull. Pa agric. Exp. Stat. **498**, 1948, 40 pp., bibl. 13, illus., and *Bull. Va agric. Exp. Stat.* **415**, 1948, pp. 40.

Cherry leaf spot and its causal organism, *Coccomyces hiemalis* Higgins, are described, and control measures by sanitation and by fungicides discussed. Results of control trials indicate that 2 or 3 different fungicides are needed. Bordeaux mixture is considered fairly satisfactory for spraying after harvest. Lime-sulphur, the proprietary copper fungicides and Compound 341 (principal active fungicidal ingredient 2-heptadecylglyoxalidine) may be used before harvest. Compound 341 has given excellent control with no fruit dwarfing and little injury in most tests, but it requires standardization before it can be thoroughly recommended.

2568. DUNEGAN, J. C., AND GOLDSWORTHY, M. C. 634.25-2.4
The control of blossom blight and its relation to brown rot of Red Bird peaches at harvest.
Plant Dis. Reptr, 1948, **32**: 136-7.

In an experiment on peach trees one compound, 2,3-dichloro-1,4-naphthoquinone, gave outstanding results in the control of blossom blight (*Monilinia fructicola*) and the trees sprayed with this material had less rotted fruit at harvest than did any of the trees sprayed with other compounds tested. The trees were sprayed on 18 April when the first blossoms were opening, and again on 22, 25 and 28 April.

2569. HAHN, G. G. 634.723-2.4
Immunity of Canadian black currant selections from blister rust.
Phytopathology, 1948, **38**: 453-6, bibl. 8.

In the tests described two Canadian black currants (hybrids from crossing *Ribes ussuriense* (an Asiatic black currant species) with *R. nigrum* var. Kerry) showed immunity from currant rust, *Cronartium ribicola*.—Yale University, New Haven, Conn.

2570. KATZNELSON, H., AND RICHARDSON, L. T. 634.75-2.3/4
Rhizosphere studies and associated microbiological phenomena in relation to strawberry root rot.
Sci. Agric., 1948, **28**: 293-308, bibl. 29, illus., being *Contr. Div. Bact. Dairy Res.* **256** (J.S.), and *Div. Bot. Plant Path. Sci. Serv. Dep. Agric. Canada* **930**.

Treatment of soil infested with root rot with dried blood, acetic acid and by steam sterilization resulted in the reduction of the disease factor and the development of clean, healthy strawberry roots. Oat straw appeared to increase the severity of the disease. The effects of the various treatments upon the soil fungi, bacteria and actinomycetes are discussed. Certain pathogenic fungi were particularly sensitive to acetic acid. Metabolic products of *Fusarium*, *Cylindrocladium* and *Cylindrocarpon* caused rapid wilting of strawberry seedlings. Inoculation trials indicated that *Rhizoctonia solani* was the most serious of the pathogens used. *Pythium* sp. was capable of rapid penetration of strawberry roots.—St. Catherines, Ontario.

2571. BONGINI, V. 634.451-2.4
Cancro del cachi. **(Canker of the kaki, *Diospyros kaki*.)** [English summary ½ p.]
Ann. Sper. agrar., 1948, **2** (N.S.): 107-27, bibl. 36.

A detailed description of the appearance and ravages of *Phomopsis diospyri* on kaki in Northern Italy. Low temperature and certain cultural practice probably favour its occurrence. A fair measure of control was achieved by painting the trunk from collar to crown with a thick mixture of milk of lime and sulphate of copper (3% to 5%) during the summer and repeating in autumn and the following spring.—Lab. sper. Fitopat. Turin.

Mites, insects and other pests.

(*See also* 2450, 2862, 2863.)

2572. GAYFORD, G. W. 634.1/2-2.6/7
Winter pest control.
J. Dep. Agric. Vict., 1948, **46**: 262.

For the control of bryobia mite and woolly aphis, red oil, 1 in 20, is recommended, applied as late as possible before bud burst. For green peach aphis, sprays of DNC, 1 in 35, or tar distillate, 1 in 40, will kill most of the eggs if applied thoroughly between the end of June and the middle of July (in Victoria).

2573. LARUE, P. 632.95
Lampe piège. **(Light traps.)**
Arbres et Fruits, 1948, No. 29, p. 8.

An American model of a pale blue lamp is illustrated, which attracts and electrocutes insects. In a vineyard or orchard one lamp per acre is installed at a height of 2-4 m. or 6-7 m. respectively. Ordinarily, a 60-watt bulb is used, but a grower was able to increase his nightly catch from 400 to 850 insects by raising the wattage to 150.

2574. MASSEE, A. M. 632.6/7
Notes on some interesting insects observed in 1947.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 135-40.

These notes on 20 insect pests include reference to the effect of weather on various fruit insects and on the absence of the strawberry aphid in Kent. *Polydrosus sericeus* Sl., a green leaf weevil, is reported on strawberry, and the prevalence of the hop red spider is noted. Damage to Laxton apples by the larvae of the nutmeg moth (*Mamestra trifolii* Rott) is illustrated.

2575. MASSEE, A. M. 634.11-2.6/7
Notes on the insect fauna of sprayed and unsprayed apple orchards.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 132-4.

These data on the effect of a tar oil wash were collected 20 years ago. Forty-five species were recorded from unsprayed and twenty-one from trees sprayed with insecticides. The important species recorded were the apple capsid bug (*Plesiocoris rugicollis* Fall.) and the fruit tree red spider (*Metatetranychus ulmi* Koch) from the sprayed trees, neither of them being found on the unsprayed trees. Several beneficial species found in the untreated orchard were absent from the sprayed one.

2576. DIERICK, G. F. E. M. 632.654.2
Factoren, welke van belang zijn bij de beoordeling van de mate der spintbestrijding door wintersproeimiddelen. **(Important factors in the evaluation of results of red spider control by winter sprays.)** [English summary ½ p.]
Tijdschr. PlZiekt., 1948, **54**: 81-5.

In laboratory trials and in the open ovicidal sprays retarded the hatching of red spider winter eggs that were not killed by the spray, a result clearly seen by using a very poorly acting oil emulsion, and specially marked during the first period of hatching. During this period counts indicated 80-90%, later only 30-40% killed compared with controls. These results show the necessity for several countings. The further advanced the development of the eggs, the more sensitive they become.

2577. MONTGOMERY, H. B. S. 634.1/7-2.654.2
The problem of the fruit tree red spider.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 184-6.

A popular account of recent research on the fruit tree red spider *Metatetranychus ulmi* (Koch) Oudemans, with recommendations for its control with a winter wash of 3% petroleum oil emulsion, and a derris spray (2 lb. derris powder, 2% rotenone, per 100 gal.) during the first week of June. The post-blossom lime-sulphur sprays against scab help to control it.

2578. AUSTIN, M. D., AND MASSEE, A. M. 632.651.3: 634.1/7
Investigations on the control of the fruit tree red spider mite (*Metatetranychus ulmi* Koch) during the dormant season.
J. Pomol., 1947, **23**: 227-53, bibl. 27, illus.

An account is given of a 3-year investigation on the destruction of the winter eggs of the fruit tree red spider mite on apple by means of petroleum and DNC washes applied in January, February and March. Biological data relevant to this investigation are discussed. A mite population recording procedure is described. Measures designed to minimize risk due to spray-drift, when treatments are applied to randomized blocks, are outlined. It is shown that petroleum and DNC washes applied at the same strength, on the same day, inhibit the hatching of a high proportion of winter eggs, and that the mid-February and March applications give significantly greater egg-hatch reductions than that of January. The results obtained with petroleum and DNC are similar, no significant differences being noted. The addition of DNC to the petroleum wash did not increase the efficacy of the wash. Even when the hatching of 97% of the winter eggs has been inhibited by these washes, the mites that hatch from the surviving eggs give rise to enormous populations by the late summer and consequently even out any broad differences previously ascribed to any given treatment. Whilst the number of eggs of the first generation on sprayed trees can be correlated with the measure of winter egg destruction, this correlation cannot be made in late summer when the "build-up" of mite populations has compensated for this initial check. The "build-up" of the mite populations occurs annually and is considerable, because there are three or more generations per year in England. It is considered that a programme of winter and summer sprayings will be necessary to achieve commercial control of this pest.—East Malling Res. Stat.

2579. VAN SOEST, A. 634.13-2.73
Het optreden van perethrips (*Taeniothrips inconsequens* Uzel). **(An infestation of pear thrips.)**
Fruitteelt, 1948, **38**: 418-9.

The pear thrips appeared in the Ijsel district of Holland in May, 1947. The affected trees were sprayed with nicotine and the infection was checked. In April, 1948, however, it appeared again, and not only on pear but also on apple. This time the trees were sprayed with HETP, but, as some flowers were open, the spray was applied in the evening when bees were inactive. Again the outbreak was checked, but as all the thrips had not been killed the application had to be repeated. The damage caused is described and illustrated.

2580. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE N.S.W. 634/635: 632.73
The black thrips (*Heliothrips haemorrhoidalis*).
Agric. Gaz. N.S.W., 1948, **59**: 205.

The black thrips has recently been particularly numerous, and has caused extensive damage in New South Wales. It infects fruit trees and ornamentals, but may be controlled by spraying thoroughly with DDT emulsion (20%) 1 pint, in water 25 gal. (3 fluid oz. to 4 gal.), with a second application after about two weeks.

2581. BELLIO, G. 634.8-2.752
Esperimenti di lotta invernale con anidride solforosa contro la cocciniglia cotonosa (*Pseudococcus citri*) sulla vite. **(Sulphurous acid fumigation for the winter control of *Pseudococcus citri* on vines.)**
Ann. Fac. Agrar. Portici, 1939/40, **12**: 207-40, bibl. 7, illus. [received 1948].

An account of trials in Tunisia in 1940 in which the burning of sulphur under tents successfully controlled *Pseudococcus citri*. Details are given of amounts required, which varied according to the size and training of the vines, and of the time and labour necessary.

2582. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W. 634.1/7-2.752
The white rose scale (*Aulacaspis rosae*).
Agric. Gaz. N.S.W., 1948, **59**: 306-7, illus.

The white rose scale, primarily a pest of roses, also infests raspberries, loganberries and blackberries, occurring chiefly on stems and older branches. It is described and its life-history outlined. It is controlled by spraying (during dormancy) with white oil emulsion, 1 part of oil to 40 of water; a second application, 6 weeks later, may be necessary.

2583. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W. 634.1/7-2.752
San José scale (*Quadraspidiotus perniciosus*).
Agric. Gaz. N.S.W., 1948, **59**: 305-6, illus.

This scale is present to a varying degree in most of the orchard districts of New South Wales where pome and stone fruits are grown. Its host plants include almond, apricot, peach, plum, prune, tree lucerne, and occasionally eucalyptus and wattles. The control recommended is to spray with miscible red oil at winter strength (usually 1 gal. of oil to 24 of water) during the dormant period. Lime-sulphur 1 in 10 may be used instead, if control of fungus diseases is also required; it should be applied as late as possible before the buds burst. Semi-dormant and pale oil sprays, which may be mixed with lime-sulphur, are now on the market. A single application controls San José scale and also prune scale and red mite; the proportions are: oil 1 gal., lime-sulphur 1 gal., water 18 gal. DNC at 1 in 40, as a dormant spray for the control of aphids, also controls the scale effectively.

2584. LEPAGE, H. S., GIANNOTTI, O., AND ORLANDO, A. 632.753
Os pulgões e seu combate. **(Aphids and their control.)**
O. Biológico, 1947, **13**: 200-2.

Nicotine sulphate is the standard insecticide for use against aphids. Recent studies have shown that R.B. 1018, Rhodiatox, is very effective against aphids and much cheaper than nicotine. [Rhodiatox is a new insecticide manufactured in Brazil; it appears to be similar to parathion or E 605—note *ibid.*, 1948, 14: 17-8.]

2585. YOTHERS, M. A. 632.753: 632.96: 632.951
DDT and the woolly aphid parasite *Aphelinus mali*.
J. econ. Ent., 1947, **40**: 934, bibl. 2.
The use of DDT for the control of codling moth has reduced the effectiveness of biological control of woolly aphis by *Aphelinus mali*.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2586. KASTENDIECK, M. 632.753
Kann eine normale Bekämpfung von Blattläusen während der Vegetationsperiode eine unterlassene Winterspritzung ersetzen ? **(Aphid control.)**
Ceres, Hamburg, 1948, No. 1, pp. 9-10.
Tests were made on the possibility of aphid control by measures taken in the growing season. The trials were carried out on 720 4-year-old apple spindlebush trees of different varieties and on different rootstocks. The number of fruits borne on trees of the same variety were made equal by thinning, and pests and diseases other than aphid could be eliminated or disregarded. Thus the yield and annual growth figures obtained would express differences in the effectiveness of the aphid control measures to be compared, viz. (1) winter spraying (with one of five chemicals tested) + two post-blossom sprays with Noprasit and Venetan, and (2) two post-blossom sprays with the same two preparations without winter spraying. Although treatment (1) did not achieve a complete aphid kill, the average fruit weights for this series were very much higher than those of the second series. The figures ranged from 81 and 17 g. respectively in the case of winter-sprayed and untreated Calville to 93 and 73 g. in the case of James Grieve. Average annual shoot growth of the trees in series (1) varied, according to rootstock, between 70 and 90 cm., as compared with 30 to 40 cm. on trees in series (2). The data show that aphid damage should not be underrated and that winter spraying cannot be dispensed with. Figures on the different effects of the five winter sprays are also tabulated.—B.A.S.F. agricultural research station, Limburgerhof.

2587. NICKELS, C. B., AND PIERCE, W. C. 634.521-2.76
Effect of flooding on larvae of the pecan weevil in the ground.
J. econ. Ent., 1947, **40**: 921.
Field tests indicate that about one-third of the larvae of the pecan weevil, *Curculio caryae*, may be killed by flooding the ground for 10 days in summer.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2588. GHILLINI, C. A. 634.23-2.76
Sulla " moria " dei ciliegi. **(" Moria " decline in cherries.)** [English summary 7 ll.]
Riv. Fruttic., 1948, **10**: 41-61, bibl. 15.
The cause of this serious affection of cherries which has received much attention in Italy recently [*ibid.*, 9: 4-22; *H.A.*, 18: 938] has now been determined. While there are certainly contributory factors such as unfavourable soil conditions, drought, etc., which aggravate the nuisance, the basal cause is a beetle, *Scolytus mali*. This attacks the tissues, causing a fluid to be given out which changes to gum on contact with the air. The biology of the insect on the cherry needs to be worked out and until this has been done it is suggested that solutions of lead arsenate 250-300 g. per 100 litres of water may give some control.

2589. PELLEGRIN, V. 634.23-2.4 +2.76
Mortalité des cerisiers en Italie. **(The death of cherry trees in Italy.)**
Progr. agric. vitic., 1948, **130**: 52-4.
The cause of severe mortality among cherry trees in Italy is disputable. It has been stated that trees on soils with 37 to 60% of " argillaceous elements " are healthy while on soils with 82 to 93% of such elements the plantations fail. This, however, appears not to be the only factor and the relation of the trouble to attacks by the bark beetle, *Scolytus mali*, is discussed.

2590. ROSELLA, E. 634.2-2.76
Peut-on combattre efficacement le capnode déja à l'intérieur des arbres ? **(Can the bark beetle be attacked when inside the tree ?)**
Progr. agric. vitic., 1948, **130**: 50-2.
The author discusses measures for combating *Capnodis* [*tenebrionis*], the bark beetle of stone fruit trees, in Morocco, with particular reference to the Frézal soil injection method with methyl bromide [*H.A.*, 18: 994]. He warns that the injection can cause harm if not carried out in autumn when root action is low.

2591. BERVILLE, P. 632.76: 634.2
Le problème du capnode en Provence. **(The wood-boring beetle problem in Provence.)**
Progr. agric. vitic., 1948, **129**: 279-82; **130**: 12-15.
Serious losses are caused in Provence by the *Capnodis* [*tenebrionis*] wood-boring beetle, which attacks all kinds of stone fruit trees, though the almond is rarely affected in this region. The soil and climate are particularly conducive to infestation. All the species used as rootstocks are liable to attack, but the myrobalan plum and seedling peach and apricot rootstocks most frequently suffer. Losses are most severe in plantations on hillsides and on dry soils, weakly trees being more subject to attacks than vigorous ones. On calcareous and dry soils the almond is the only rootstock resistant to *Capnodis*. No really effective control method has yet been devised; the author suggests that the synthetic insecticides and bromine derivatives may prove useful, but they should be used with caution until they have been more thoroughly tested. Dead and affected trees should be dug up and burned.

2592. HEER. 634.1/2-2.76
Maikäfer und Engerlinge können bekämpft werden ! **(The control of cockchafers and their grubs.)**
Gärtnermeister, 1948, **51**: 113-4.
" Hexa "-products were found to give effective control of cockchafer in fruit and ornamental trees. Spraying with 1·5% " Hexalo " should be carried out shortly before or after blossoming, in pome fruit at the latest one week after blossoming and in stone fruit only immediately after blossoming. " Hexaterr " should be mixed with the soil as a preventive measure against white grub in the summer or autumn of a flight year. On planting fruit trees, currants, gooseberries or raspberries about 20 g. of the chemical should be applied per plant hole. " Hexalol " (0·5-1%) should be injected by fertilizer lance, at the rate of 5-10 litre per m², where white grub damage becomes manifest. Flowers may be watered with the solution. Photographs illustrate the success of treatment in chrysanthemum and apple.

2593. FLEMING, W. E., AND MAINES, W. W. 634.8-2.7
Control of vineyard insects with DDT, with special reference to the Japanese beetle and the grape berry moth.
J. econ. Ent., 1947, **40**: 845-50.
In an isolated commercial vineyard in New Jersey lead arsenate was inadequate for controlling the grape berry moth, *Polychrosis viteana*, and the Japanese beetle, *Popillia japonica*. Experiments over three years showed that three

sprays of 1 lb. DDT per 100 gal. bordeaux, applied at pre-blossom, petal fall, and when the grapes were the size of peas, controlled the grape berry moth. These sprays also protected the vines against the Japanese beetle until mid-July, and protection for the rest of the season was provided by an additional spray of 8 oz. DDT per 100 gal. Grape leafhoppers *Erythroneura* spp. and the rose chafer *Macrodactylus subspinosus* were also controlled by these sprays.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2594. PITCHER, R. S. 634.711-2.77
Observations on the raspberry cane midge (*Thomasiniana theobaldi* Barnes) and its association with cane blight.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 141-3, bibl. 4.

A preliminary account of the way in which young raspberry canes damaged by the feeding of raspberry cane midge larvae become susceptible to fungus attacks and are killed before they can bear fruit. Possible methods of control are discussed.

2595. VELBINGER, H. H. 632.951: 634.1/8
Gesarol als wirksames Bekämpfungsmittel im Obstbau. **(Gesarol as an efficient control measure in fruit growing.)**
Zur Bekämpfung der *Rhagoletis cerasi*-Fliege in Bulgarien. **(Control of *Rhagoletis cerasi*, the cherry fly, in Bulgaria.)**
Der Einfluss der chemischen Schädlingsbekämpfung auf die Ansiedlung der insektenfressenden Vögel. **(The effect of chemical pest control measures on the settling of insect-eating birds.)**
(*Publ.*)*Ent. Abt. des Pflanzenschutzinstitutes i. Bulg. Agr. Ministerium*, 1945, pp. 3-16, bibl. 16 [received 1948].

Three short papers. 1. Tabulates results of tests with Gesarol in the laboratory and in the field; very good results against certain fruit tree pests are recorded. 2. Shows good results obtained against the cherry fly after spraying with Gesarol. 3. Chemical pest control measures by spraying or dusting had hardly any deleterious effect on the nesting and breeding of insect-eating birds.

2596. SANKEY, J. H. P. 634.75-2.78
Observations on the biology of *Hepialis lupulinus* L. (Lep.) [common swift moth].
Ent. mon. Mag., 1948, **84**: 175-7.

An account of the life history of the common swift moth on Royal Sovereign strawberries at Faversham, Kent. The spatial separation of successive plantings may give some control of the pest, whose habits make control by insecticides difficult.

2597. PARKER, R. L., AND ESHBAUGH, E. L. 632.654.2+632.78
Codling moth and mite control in Kansas with new insecticides.
J. econ. Ent., 1947, **40**: 861-4, being *Contr. Dep. Ent. Kans. agric. Exp. Stat.* **551.**

New insecticides were compared with lead arsenate, lead arsenate+zinc sulphate (+summer oil emulsion for the early covers) and nicotine (+oil for some covers), using two Jonathan apple trees for each treatment. Nicotine+DDT, DDT and its methoxy analogue gave good control of codling moth, but 666 was comparatively ineffective. DDT, to which hydroxypentamethylflavan was added for the 4th to 7th covers, gave good control of the two-spotted mite also.

2598. STEPHENS, R. M. 632.78
Codling moth control, DDT trials in the Goulburn valley.
J. Dep. Agric. Vict., 1948, **46**: 212-4.

Efficient control of codling moth was obtained with 3 sprays of 0·1% DDT. This is superior to either 2 of 0·1% or 3 of 0·05%.

2599. COUTIN, R., AND GRISON, P. 634.1/2-2.78
Les dégats de l'hyponomeute en 1947. **(Ermine moth damage in 1947.)**
Jardins de France, 1948, **2**: 129-30, bibl. 2.

The unexpected infestation of the ermine moth, *Hyponomeuta padella*, on top fruits in France in 1947 may have been due to the failure of biological control, following the extensive use of synthetic organic insecticides. The use of arsenicals allows the development of parasites in surviving caterpillars.—Station Centrale de Zoologie Agricole, Versailles.

2600. MARTELLI, M., AND SERVADEI, A. 634.22-2.796
Orientamenti tecnici ed economici nella lotta contro le tentredini del susino. **(The control of plum sawflies.)** [English summary 12 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 129-38, bibl. 9.

In trials in the spring of 1947 against *Hoplocampa flava* and *H. minuta* the best and cheapest results came from the application of a 2% quassia spray on blossom and a 0·5% lead arsenate spray after petal fall. A water suspension of DDT—applied after petal fall to avoid danger to bees—was also very effective.—Staz. Ent. agrar. Florence.

2601. DICKER, G. H. L. 634.75-2.651.3
A preliminary report on the strawberry eelworm (*Aphelenchoides fragariae* Ritzema Bos).
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 144-7, bibl. 10, illus.

Eelworms, obtained from strawberry plants bearing puckered and twisted leaves with browning or yellowing on the dorsal surface at the base of the midrib, were identified as *Aphelenchoides fragariae* and when transferred to healthy Royal Sovereign plants produced similar symptoms. The main eelworm population lives in the crown of the plant, the growing tip of which may be killed, causing the premature production of secondary crowns, which in turn become invaded with eelworms and produce the condition known as red plant. The most satisfactory control method appears to be the removal of infested plants from runner beds in March, May and late summer.

2602. HERKLOTS, G. A. C. 632.64
Giant African snail (*Achatina fulica*).
Food and Flowers, Hong Kong, 1948, No. 1, pp. 1-4, bibl. 1, illus.

A note on the introduction of this pest into Hong Kong and other countries with some hints on its control. Meta powder mixed with dry rice bran, 1 : 30 to 50 parts, is effective in protecting garden beds. A cement-lime wash containing 1% calcium arsenate applied to walls, rocks, etc., in the vicinity of a garden will help in controlling the pest.

2603. THOMAS, D. C. 632.64
The use of metaldehyde against slugs.
Ann. appl. Biol., 1948, **35**: 207-27, bibl. 14.

One part of metaldehyde in 30 parts of bran by volume is the minimum effective concentration for obtaining an economic kill of slugs under average weather conditions. For use against *Milax gracilis* heaps of bait should not be normally more than 2 yards apart and against *Arion hortensis* not more than 3 ft. apart. Metaldehyde-bran-casein glue bait broadcast in "broken biscuit" form is effective over a longer period, thus producing a greater kill of slugs, than a broadcast metaldehyde-bran bait.—N.A.A.S., Exeter, Devon.

2604. HUBER, G. 632.693
Wildschadenverhütung. **(The prevention of hare and deer damage.)**
Ceres, Hamburg, 1948, No. 2/4, p. 31.

An excellent repellant effect is reported of the tar preparation Demarkol, produced in Germany. Granulated peat is

saturated with the chemical and the substance is spread in 20 cm. long bands, interrupted by distances of 50 cm., around the area to be protected. The preparation is very weather-resistant. Experiments on the reaction of fruit tree bark to Demarkol are in progress.

Sprays and spraying.

(*See also* 2359, 2360.)

2605. Whiffen, H. J. 632.95
Spraying facts and figures.
Fruitgrower, 1948, **106**: 166-7.
Various considerations affecting the operation of automatic spraying machines are discussed. Tables are given showing nozzle outputs for various discs and swirl plates, and gallons per acre applied at different planting distances with various rates of output from the spray bar.

2606. Mousset, M. 632.943: 631.588.1
Poudreuse électrique " Bourrasque ". **(An electrically operated duster.)**
Jardins de France, 1947, **1**: 278-80.
This knapsack duster is driven by an electric blower, and only one hand is needed to direct the dust. An accumulator can operate the blower for 6 hours between charges. The duster weighs 11·2 kg., and its capacity is 10·6 litres.

2607. Staniland, L. N., and Mayor, J. 632.943
A home-made dusting machine for ridge and rowcrop work.
Agriculture, Lond., 1948, **55**: 203-7, illus.
Neither of the two models discussed *ibid.*, 1948, 54: 518-24 (*H.A.*, 18: 1078) can be used where crops are grown on the ridge. The present article describes a machine, which will apply a very even cover of dust over ridges or plants not exceeding a height of 11 in. for the control of flea beetles or other pests. Diagrams help to explain design and construction of the horse- or tractor-drawn implement.

2608. Mommers, J. 638.12: 632.95
De betekenis van de nieuwe spuit- en stuifmiddelen voor de bijenteelt. **(The significance of the new sprays and dusts in beekeeping.)**
Meded. Direct. Tuinb., 1948, **11**: 464-6.
A review of present knowledge on the effect on bees of some of the new insecticides (including cryolite, rotenone, DDT, HCH, DDD, HETP and TEPP) based chiefly on an article by J. E. Eckert (*Amer. Beekeepers' J.*, March, 1948). In general it may be said that they are all more or less poisonous to bees.

2609. Rasmussen, E. J., Toenjes, W., and Strong, F. C. 634.11: 632.95
Effect of spray treatment on foliage injury, pest control and yield and quality of apples.
Spec. Bull. Mich. agric. Exp. Stat. **347**, 1948, 26 pp., bibl. 9, illus.
Trees sprayed with the less caustic materials such as wettable sulphur, proprietary copper compounds, and some organic fungicides at 3 to 7 day intervals produced larger yields and were as free from disease and insect injury as trees sprayed with lime-sulphur. Lime-sulphur caused a reduction in yield on all varieties sprayed in these tests, varying from 27·3 to 53·5%. The use of the less caustic materials requires more timely and thorough applications than lime-sulphur. Hormone sprays are more useful in delaying apple drop when warm weather occurs just prior to, or during, the early part of the harvest season than during the cool seasons.

2610. Steenland, A. P. 634.25-2.952
Bordeaux as a cause of injury to peach trees in Oregon.
Plant Dis. Reptr, 1948, **32**: 62-3.
Injury has been observed after picking on peach trees sprayed with bordeaux mixture 8-4-100 to control peach blight (*Coryneum beijerinckii*) and dieback. Lesions are dark red to black and do not extend into the wood. It is suspected that this spray is doing more harm than good.

2611. Suit, R. F. 634.84-2.19: 546.56
Effect of copper injury on Concord grapes.
Phytopathology, 1948, **38**: 457-66, bibl. 7.
Spray treatments in order of decreasing injury on Concord grapes were, neutral coppers, bordeaux mixture, and neutral coppers+lime. Copper injury caused by neutral copper fungicides is characterized by small yellow leaves and reduced cane growth and yield. With bordeaux mixture the reduction in size of the leaves and the change of colour were not apparent.—New York State Agricultural Experiment Station.

Antibiotics.

2612. Cook, A. H., Cox, S. F., and Farmer, T. H. 632.4: 632.96
Antibiotics produced by fungi, and a new phenomenon in optical resolution.
Nature, 1948, **162**: 61, bibl. 3.
A discussion of the antibiotics isolated from *Fusarium lateritium* and *F. orthoceras*, termed lateritiin-I and enniatin respectively. In the authors' view the two substances are identical.—Imperial College of Science and Technology.

2613. Lebedev, D. V. 632.951/2
Seeking antibiotics among the higher plants. [Russian.]
Priroda (Nature), 1948, No. 6, pp. 62-3, bibl. 9.
A review of present knowledge of antibiotics in flowering plants with particular reference to the work of L. E. Hayes [*H.A.*, 17: 1361]. Antibiotics have been found in 46 species, and are particularly potent in 18.

2614. Bendz, G., Wallmark, G., and Öblom, K. 632.4: 632.96: 632.3
The antibiotic agent from *Marasmius ramealis*.
Nature, 1948, **162**: 61-2, bibl. 6.
The volatile constituents of the antibacterial agent from *Marasmius ramealis* showed a certain resemblance to allicin, the antibacterial principle of garlic.—University of Uppsala and State Bacteriol. Lab., Stockholm.

2615. de Ropp, R. S. 632.314
Action of streptomycin on plant tumours.
Nature, 1948, **162**: 459-60, bibl. 2.
An experiment is reported showing the frequency of tumour formation in fragments of carrot tissue inoculated with *Phytomonas tumefaciens* and treated with streptomycin. Where streptomycin was applied 1 or 2 days after inoculation almost complete inhibition of tumour formation occurred. This inhibiting effect is probably due to its action on the bacteria-inciting agent.—N. York Bot. Gdn.

Fungicides.

(*See also* 2660o.)

2616. Plant Disease Survey Division, U.S. Department of Agriculture. 632.952
Report of the special committee on the co-ordination of field tests with new fungicidal sprays and dusts, with reference to results obtained in 1947.
Plant Dis. Reptr, Suppl. **174**, 1948, pp. 39-86.
After a foreword by J. D. Wilson, this report consists of the following:—
(1) Index of fungicides and crops on which they were used in the various tests.
(2) Report of the section of fungicide tests for the control of apple diseases, 1947. (J. M. Hamilton.)
(3) Summary of data on co-operative fungicide tests on onions, carrots and celery for 1947. (A. G. Newhall and J. D. Wilson.)

(4) National cucurbit fungicide test, 1947. (J. W. Heuberger.)
(5) Co-operative tests of fungicides for control of diseases of ornamental plants. (A. W. Dimock.)
(6) Summary of data from national co-operative potato spray fungicidal experiment. (W. F. Buchholtz.)
(7) Report of the section of fungicide tests on the stone and small fruits. (H. F. Winter.)
(8) Summary of 1947 co-operative tomato fungicide experiments. (M. B. Linn and J. D. Wilson.)

2617. Plant Disease Survey Division, U.S. Department of Agriculture. 632.952
1947 fungicide tests: a summation of nation-wide results with newer fungicides.
Plant Dis. Reptr, Suppl. **176**, 1948, pp. 95-142.
Information was received from about 145 professional workers in 47 States and Canadian Provinces. The reports included more than 130 different fungicides used on soils or on some 57 different kinds of plants, seeds or planting stock. A list of the fungicides shows their trade name, active principle and source. Results are given for diseases of fruit, vegetables, ornamental crops (including shade trees and turf) and plant beds, for soil sterilization and fumigation and for seed treatment.

2618. Moore, M. H. 634.11-2.952
An experiment in applying undiluted lime-sulphur to apple trees.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 129-31, bibl. 2.
Undiluted lime-sulphur was applied, by spraying (with a hand operated solo sprayer) and by atomizing (using a motor-driven compressor), to dwarf-pyramid apple trees of five varieties in mid-summer. The atomized fog was quite safe on four varieties and caused only slight pallor on the leaves of Lane's Prince Albert.

2619. Moore, M. H. 634.11-2.952
Improving the field performance of standard protective fungicides. II. The use of ferrous sulphate to diminish spray damage on apple.
J. Pomol., 1947, **23**: 139-48, bibl. 16.
The addition of ferrous sulphate to lime-sulphur at 1-60 applied post-blossom, with or without lead or calcium arsenate, greatly reduced early spray-induced leaf-drop present on apple varieties Cox's Orange Pippin and Worcester Pearmain, but failed to prevent, though mitigating, severe fruit-drop on both varieties. There was no evidence that the addition impaired the fungicidal value of the combined spray. Calcium-arsenate powder (0·4%) proved more phytotoxic than lead-arsenate paste (0·4%) of much lower As_2O_5 equivalent. With lime-sulphur at 1-100, the paste and a colloidal form (0·4%) were each rather less phytotoxic on Cox than a powder form (0·2%) of double As_2O_5 equivalent. The addition of ferrous sulphate to the combined spray prevented early leaf-drop on Cox, but failed substantially to prevent fruit-drop and also depressed acaricidal value. Zinc sulphate was an unsatisfactory alternative to ferrous sulphate. Worcester proved much less susceptible than Cox to spray damage, most of which was caused by the second post-blossom (June) application. [Author's summary.]—E. Malling Res. Stat., Kent. (See *H.A.*, 16: 1427.)

2620. Marsh, R. W. 634.1/7-2.952
Fruit spraying trials with certain recently-introduced fungicides.
J. Pomol., 1947, **23**: 185-205, bibl. 43.
The assessment of field performance of fungicides in 1944-47, using control of apple scab, *Venturia inaequalis*, as the criterion, yielded the following results: Ferric dimethyldithiocarbamate and tetramethylthiuram disulphide are non-phytocidal, but they are inferior in fungicidal performance to lime-sulphur. The spray residue of ferric dimethyldithiocarbamate on apples is disfiguring and persistent. Phenyl mercury chloride, at the strength tested, is approximately equal to standard lime-sulphur applications in fungicidal effect. The material has proved generally safe, but certain experimental preparations have caused spray damage. Hydroxyquinoline sulphate showed no fungicidal value in these experiments. In one season's trials, heptadecylglyoxalidine equalled lime-sulphur in apple scab control and caused no damage to sulphur-sensitive varieties. In tests against brown rot of fruits, promising results in the inhibition of the sporing of *Monilia fructigena* on mummied plums were obtained in a preliminary winter trial of phenyl mercury chloride compounded in an oil emulsion. Spraying of apples in late June with ferric dimethyldithiocarbamate reduced the spread of brown rot infection when the attack was light. Field tests of fungicides against black currant leaf spot (caused by *Pseudopeziza ribis*) show that heptadecylglyoxalidine, dichlornaphthoquinone and the dithiocarbamate sprays all provide satisfactory control of the disease. Thiocarbamate spray residues are not deleterious to canned black currants if the sprayed fruits are heated before canning, but the undecomposed thiocarbamates are objectionable in stored canned products. [From author's summary.]—Long Ashton Res. Stat., Bristol.

2621. Meza, F. E. 632.95
Algo sobre terapeutica vegetal. **(Plant therapeutics.)**
Rev. mens. B.A.P., 1947, **30**: 357: 31-4.
A short general account of substances used in plant protection, with a striking 2-page chart showing the degree of compatibility between fungicides and insecticides, including some of the newer products.

Insecticides and insecticidal plants.

(*See also* 2660e, o, 2671, 2672.)

2622. Wilson, H. F., Dieter, C. E., and Burdick, H. L. 632.951: 631.588.1
Insecticidal dusts.
Soap san. Chem., April, 1941, **17**: 99, 101, 121, bibl. 6 [received 1948].
Laboratory tests using pea plants infested with aphids showed that the toxicity of certain insecticidal dusts was affected by the magnitude of the electrostatic charge produced in the duster. The charge depended on the nature of the insecticide and diluent, and with some combinations it was affected by the addition of oil.—Wisconsin agric. Exp. Stat.

2623. McKusick, B. C. 632.951
New compounds as insect repellents.
J. Amer. chem. Soc., 1948, **70**: 1982-3, bibl. 4.
The 14 compounds listed and described were prepared as part of a project to discover new insect repellents. Their insecticidal properties are not stated.—Harvard University.

2624. Fransen, J. J. 632.951
De verschillende vormen, waarin een bestrijdingsmiddel kan worden toegepast. **(The different forms in which an insecticide can be applied.)**
Tuinbouw, 1948, **3**: 106-7.
Discusses the various forms in which DDT can be applied, viz. (1) as a dust, (2) dissolved in oil, (3) emulsions, (4) wettable powder, (5) aerosol, and (6) vapour. Nicotine, pyrethrum, hexachlorocyclohexane and others can also be used in these six modifications, but derris is not suitable for vaporizing or aerosols.

2625. Frezal, —. 632.951
Sur l'action insecticide de l'octochlornaphtalène. **(The insecticidal action of octochlornaphthalene.)**
C.R. Acad. Agric. Fr., 1948, **34**: 656-61.

It is concluded from results, which are here tabulated, that octochlornaphthalene is a useful insecticide, rather inferior to DDT but comparable with HCH. It should occupy an important place in agriculture, particularly as it apparently does not transmit to plants treated any disagreeable odour or taste and is readily emulsified in water. The experiments were carried out on codling moth, eudemis of vine and the common cluster grub (*Prodenia litura*).

2626. LANGER, C. A. 634.1/2: 632.95: 631.55
Effect of wax sprays on the yield of cherries, pears, and apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 191-5, bibl. 3.
Trials in Michigan orchards in 1947 with Dow Wax 222 confirm previously held theories that oil-wax emulsion spraying increases size of fruit. Application to fruit and foliage during the growing season resulted in increase in size of 14, 24, and 7-12% respectively in the fruit of three varieties of cherry, 10-16% in Bartlett pears 2½ in. and over; but no increase in Keiffer pears or Delicious and Golden Delicious apples.

2627. GOLDSWORTHY, M. C. 634.75-2.951
Effect of soil applications of various chlorinated hydrocarbons on the top growth of Blakemore strawberry plants.
Plant Dis. Reptr, 1948, **32**: 186-8.
The technical DDT used in this experiment caused the greatest suppression of growth and para para isomer of DDT was much less injurious than the technical DDT. None of the other chemicals appeared to have any deleterious effects on the growth of Blakemore strawberry plants. Some appeared to accelerate growth, and especially was this true of benzene hexachloride.

2628. WALKER, K. C. 632.951
DDT residue and its removal from apples and pears.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 85-9.
If excessive or late DDT spraying is carried out, how to eliminate the residue has not been determined.

2629. FLECK, E. E. 632.951
Report on DDT.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 368-72, bibl. 8.
Recommends official and tentative methods for the determination of total chlorine in emulsions containing DDT, solvent, emulsifying agent, and water.

2630. GOLDSWORTHY, M. C., AND DUNEGAN, J. C. 634.75-2.951
The effect of incorporating technical DDT in soil on the growth of Blakemore strawberry plants.
Plant Dis. Reptr, 1948, **32**: 139-43.
Results obtained indicated that there was a significant reduction in the number of new runner plants and in the correlated green and dry weights of the plants when the soil concentration of technical DDT reached a value of 12 lb. per acre. At increasing dosages the losses were significantly higher until at 100 lb. per acre the number of plants and the green and dry weight values were approximately half those from the 6 lb. plot. The mother plants were not killed.

2631. LOMBARDI, P. L. 632.951: 638.2
L'azione del DDT sugli allevamenti del baco da seta. **(The effect of DDT on silkworm larvae.)**
Ann. Sper. agrar., 1947, **1** (N.S.): 359-68.
As the result of trials in 1947 the author is able to make certain recommendations on the appropriate times at which DDT can be used for control of mosquitoes without detriment to the control achieved, or to silkworms.

2632. CARTER, R. H. 613.2: 632.951
Report on DDT in foods.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 355-8, bibl. 3.
A discussion of the labile-chlorine and total-chlorine methods of DDT residue determination, with apple strip [peeling] solutions as the experimental material.

2633. NEUWIRTH, F. 632.951: 615.779.1
Další skušenosti s pěstěním kopretiny starčkolisté. **(Further experience in the cultivation of *Pyrethrum cinerariaefolium*.)** [Russian and English summary pp. 272-3.]
Vest. Čsl. Akad. Zeměd., 1948, **22**: 5-6, pp. 262-73.
The author has introduced pyrethrum strains from Yugoslavia for cultivation in Czechoslovakia. The plant has been acclimatized in Slovakia with a pyrethrin content of 1·5%. In further trials in Bohemia with seed from this Slovakian grown crop a crop of 19 quintals per hectare was obtained with an average pyrethrin content of 0·9%. Its cultivation has proved possible even in the heaviest soils and at places where there is a high water level. Here ridge cultivation proves successful. A harvesting and drying method is described.

2634. HIGBEE, E. C. 632.951
Lonchocarpus, derris, and pyrethrum cultivation and sources of supply.
Misc. Publ. U.S. Dep. Agric. **650**, 1948, pp. 36, bibl. 45, illus.
These three insecticidal plants are dealt with in turn from the standpoint of their botany, sources of commercial supplies, methods of cultivation and harvesting, and (pyrethrum excepted) the selection of superior strains. Reference is made to the use of a tractor-drawn, high-speed vertical screw plough for harvesting derris root. A mechanical harvester for pyrethrum flowers is illustrated, but is not described. [Amongst the pyrethrum literature cited there is no reference to that of East Africa—a strange omission.]

2635. VAN HEETEREN, H. V. A. 633.887.791(922): 632.951
Mogelijkheden voor de cultuur van pyrethrum (*Chrysanthemum cinerariaefolium* Vis.) op Java. **(The possibility of growing pyrethrum in Java.)** [English summary ½ p.]
Landbouw, 1948, **20**: 149-64, bibl. 1, being *Meded. alg. Proefstat. Landb.* **73.**
An account of the ecology, cultivation and preparation of pyrethrum. Trial plantings in Java show that at elevations above 1,800 m. flowering is satisfactory. The variation between tested clones shows the necessity of selection; pyrethrin contents were normal. The area of land in Java suitable for growing pyrethrum is sufficient to supply Indonesian needs, but large exports are unlikely.

2636. GADDUM, E. W. 615.779.1: 632.951
The rotation of pyrethrum.
Kenya Pyrethrum News, 1948, **3**: 1: 10-11 and **2**: 10, illus.
A brief description of rotation experiments recently laid down in Kenya, the cropping being: continuous pyrethrum, pyrethrum/cereals, pyrethrum/grass, pyrethrum/cereals/grass.

2637. LEPAGE, H. S., GIANNOTTI, O., AND ORLANDO, A. 632.651.3: 632.951
Notas sôbre o combate ao nematóide da raiz (*Heterodera marioni*) pelo fumigante DD. **(The control of the root nematode *Heterodera marioni* with DD.)**
O Biológico, 1947, **13**: 123-4, illus.
In soil infested with *Heterodera marioni*, yam beans (*Pachyrrhizus tuberosus*) produced a greater yield of tubers with fewer root nodules, where DD had been injected into the soil before sowing.

2638. Lepage, H. S., Giannotti, O., and Orlando, A. 632.951
Toxidês dos constituintes das sementes de *Pachyrrhizus tuberosus* (Lam.) Spreng. var. *vermelha*, para o afídeo *Brevicoryne brassicae* L. (*Homoptera-Aphididae*). **(Toxicity of the constituents of seeds of the red variety of *Pachyrrhizus tuberosus* to the aphid *Brevicoryne brassicae*.)** [English summary 13 ll.]
Arq. Inst. Biol., 1946, **17**: 249-58, bibl. 17, illus. [received 1948].
The toxicity of ether extract and of an emulsion of oil expressed from the seeds of a red variety of yam bean were compared with that of a lonchocarpus root extract. A multiplication plot of 218 stands produced 41 kg. seed and 270 kg. of tubers.

*Weeds and their destruction.**

(*See also* 2744, 2846, 2873, 2923, 2924, 2928, 2948-2951, 3131.)

2639. Roe, R., and Shaw, N. H. 632.51
Mint weed, *Salvia reflexa* Hornem. Present distribution and status in Australia.
Bull. Coun. sci. industr. Res. Aust. **231**, 1947, pp. 16, bibl. 7, illus.
The results of a survey of mint weed in relation to soil and vegetation types are presented. Its geographical distribution in Southern Queensland is mapped. The results to date of experiments on methods of control are summarized. The status of the species as a weed in Australia is discussed. [From authors' summary.]

2640. Bibbey, R. O. 632.5: 631.531
Physiological studies of weed seed germination.
Plant Physiol., 1948, **23**: 467-84, bibl. 23.
Environmental influences on the after-ripening and dormancy of seeds of a number of species were studied in the field and laboratory. Seeds of *Melilotus alba* were still in a state of primary dormancy after 17 years in the soil. Seeds of *Thlaspi arvense* and *Brassica arvensis*, which display marked environmental dormancy after losing primary dormancy during the first year, were shown to be much more sensitive to abnormally low O_2 or abnormally high CO_2 pressures than were seeds of *Triticum vulgare* and *Brassica juncea*, which are relatively short lived in soil. [From author's summary.]

2641. Grigsby, B. H. 632.954
Selective control of crabgrass (*Digitaria* sp.).
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 369-73.
In small-scale trials the petroleum base compounds L-2687 and L-2988 showed considerable promise in the control of crab and other annual grass. Under Michigan conditions the chemicals proved non-injurious to lawns and to a number of crops, including beans, field peas, onions, peppermint and gladiolus. The death of susceptible plants normally occurs 5-8 days after spraying. The investigation is being continued.

2642. Botha, P. J. 581.144.2: 632.5
The parasitism of *Alectra vogelii* Benth. with special reference to the germination of its seeds.
S. Afr. J. Sci., 1948, **44**: 119.
Alectra vogelii Benth., root-parasite of angiosperms, causes serious damage to leguminous crops in certain areas of the Transvaal and Southern Rhodesia. The roots of the host plants exude a substance which is necessary for the germination of the seeds of the parasite. Nearly all the leguminous species tested exuded such an activating substance, whereas the non-leguminous species did not. It is concluded that the embryo of the parasite probably suffers an avitaminosis, the host roots supplying the missing factor necessary for germination. [From author's abstract.]

2643. Crafts, A. S. 632.954
A theory of herbicidal action.
Science, 1948, **108**: 85-6, bibl. 6.
The following generalization is made concerning absorption of herbicides: for penetration of the cuticle and absorption by foliage, non-polar compounds should be used, for absorption by roots, polar compounds. It is stated that this rule provides a sound theoretical basis for predicting the herbicidal uses of various toxic materials.

2644. Crafts, A. S., and Reiber, H. G. 632.954
Herbicidal properties of oils.
Hilgardia, 1948, **18**: 77-156, bibl. 11, illus.
A preliminary survey of the position with particular reference to oil types, rather than to crops, weeds and methods of control.

2645. Akesson, N. B. 632.954
Chemical weed control equipment.
Calif. Agric., 1948, **2**: 7: 7, 16, illus.
For the best results pumps, power, tanks, brooms and nozzles must be suited to the crop treated. Some notes are given on these items of equipment.

2646. Stahler, L. M., Larson, A. H., and Dunham, R. S. 632.954: 577.17
Chemicals crack down on weeds.
Minn. Farm and Home Sci., 1947, **4**: 3: 1, 10-11, illus.
Sodium chlorate and borax are used as general herbicides. Ammonium sulphamate is highly specific for poison ivy, wild rose, wild cherry, raspberry, and certain other woody plants. Large stumps of various tree species can be prevented from sprouting by 2 oz. ammonium sulphamate per 6 in. diameter, applied in holes bored round the perimeter of the freshly cut stump; stumps so treated rot more rapidly than those killed with arsenicals. Other selective weed killers discussed are the sodium salt of dinitro-*o*-cresol, the ammonium salt of dinitro-*o*-secondary butyl phenol, and preparations of 2,4-D.

2647. Hildebrand, E. M. 632.954
Chemical control of weeds.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 383-91, bibl. 53.
A discussion largely confined to recent work on chemical herbicides with emphasis on the growth-regulator type.

2648. Bakker, D. 577.17: 632.954
Onkruidbestrijding op groeistofbasis. **(Growth substances as weedkillers.)**
Tijdschr. PlZiekt., 1948, **54**: 95-107, bibl. 69.
A general review of the subject, mostly with reference to the destruction of weeds in grassland and grain crops, along the following lines: The discovery of hormone weedkillers; their properties, selective killing action, and application, the after-effects of 2,4-D and MCPA in the soil, toxicity to men, animals and micro-organisms, physiological effects, abnormalities in plants induced by phenoxyacetic acid derivatives.

2649. Akamine, E. K. 632.954: 577.17
Plant-growth regulators as selective herbicides.
Circ. Hawaii agric. Exp. Stat. **26**, 1948, pp. 43, bibl. 183.
The author attempts to present and summarize all available published reports on the subject under the following main heads. Historical development; selectivity when applied to foliage, soil, and nutrient cultures; persistence of 2,4-D toxicity in soil; methods of applying 2,4-D; morphological and histological responses; determination of growth regulators; synthesis and chemical properties; physiological studies of herbicides; effect of 2,4-D on animals

* Not confined to orchard weeds.

and man; isopropylphenylcarbamate (IPC); historical reviews of weed control.

2650. LUGEON, A. R. 632.954: 577.17
Répercussions tardives d'un traitement aux hormones désherbantes. **(Delayed effects of growth-regulating weed killers.)**
Rev. hort. suisse, 1948, **21**: 269-71, illus.
A note of warning with regard to spring phenomena in deciduous fruit trees following autumn application of herbicides.

2651. WILSON, H. K., LARSON, A. H., AND STAHLER, L. M. 632.51
Competitive crops effective in stopping field bindweed.
Reprinted from *Minn. Farm and Home Sci.*, 1945, **2**: 3: 2, illus.
Field bindweed, *Convolvulus arvensis*, was eliminated in four years by using a duckfoot cultivator at a depth of 5 in. on 1 and 15 June and 1 July and sowing a smother crop of soya beans, sorghum (amber cane) or sudan grass. A firm seedbed was essential. The crops were used for feeding.

2652. WURGLER, W. 577.17: 581.45
Observations sur le transport de l'acide 2,4-dichlorophénoxyacétique dans les plantes ligneuses. **(The movement of 2,4-D in woody plants.)**
Rev. hort. suisse, 1948, **21**: 239-42, bibl. 5, illus.
Leaves produced by a bud under the influence of 2,4-D are generally narrowed and their main veins form angles more acute than in normal leaves, hence leaf deformation was used to indicate the presence of 2,4-D. The upward movement of 2,4-D in the woody plant is more rapid than the downward.

2653. HAMNER, C. L., AND KIANG CHI-KIEN. 632.954: 577.17
Use of plastic material to increase the action of the sodium salt of 2,4-D.
Science, 1948, **107**: 572-3, bibl. 2, illus., being *J. Art. Mich. agric. Exp. Stat.* **958** (N.S.).
Experimental results with kidney beans are quoted which indicate that when Geon 31X latex, a water-dispersible, non-toxic plastic material, is added to 2,4-D, either directly in solution or as a coating over plants previously treated with 2,4-D, the effect of the herbicide is greatly increased. The manner in which the plastic material acts is not known. Three possible explanations are put forward.

2654. HALPERIN, L. 632.954: 577.17
Surge un poderoso aliado en la lucha contra las malezas: el, 2,4-D. **(A powerful ally in combating weeds: 2,4-D.)**
Rev. mens. B.A.P., 1947, **30**: 360: 52-4.
A note on 2,4-D as a selective herbicide, with a list of weeds controlled by it, giving their scientific, N. American and Argentinian names and indicating whether or not they are present in Argentina.

2655. HAMNER, C. L., AND TUKEY, L. D. 632.954: 577.17
A simple device for applying ground sprays.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 468-72.
The adaptation of a 3-gallon hand sprayer to applications of concentrated ground sprays of 2,4-D on lawns, etc., is described and illustrated. The sprayer is mounted on a hand garden cultivator and equipped with a spray boom.

2656. WARREN, G. F., BUCHHOLTZ, K. P., AND HERNANDEZ, T. P. 632.954: 577.17
Preliminary studies on the effects of soil applications of 2,4-D on crop and weed growth.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 373-82, bibl. 11, illus.
A record of experiments to determine the effect of applications of 2,4-D to the soil, under field conditions, on weed control, and on the germination and growth of certain crops, including beans, carrots and onions. The results indicate that good control of foxtail, purslane, pigweed and certain other annual weeds may be obtained by soil applications of 4 or more pounds per acre of the sodium salt of 2,4-dichlorophenoxyacetic acid. The treatments seemed to affect only germinating seeds since new weeds started to grow in undisturbed soil when the toxicity of the 2,4-D had disappeared. The time required for dissipation of the 2,4-D appeared to be influenced by both rate of application and soil moisture. The germination of all crop plants tested, with the exception of oats and sweet corn, was reduced by 2,4-D soil treatments applied at or just before planting time. Excellent control of weeds was obtained when 2,4-D was worked into the soil before planting. Weed control was not quite as good when 2,4-D was applied as a pre-emergence spray. The post-emergence treatments gave good control of late weeds, but resulted in only about 50% reduction in the number of weeds at the time of the first weeding. Pre-planting and pre-emergence treatments with 2,4-D on onions appear to warrant further study. [From authors' summary.]—Univ. of Wisconsin.

2657. KNOWLES, G. 632.954: 577.17
Simplifying 2,4-D.
Publ. **807** or *Circ. Dep. Agric. Canada* **178**, 1948, pp. 8.
Dosages for various weeds are suggested, in terms of pure 2,4-D per acre. A table shows the proportion of pure 2,4-D in many proprietary preparations, and the amounts needed to supply various rates of pure 2,4-D per acre.

2658. PRIDHAM, A. M. S. 632.954: 635.9
Delayed action of 2,4-D on trees, shrubs, and perennials.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 395-7, bibl. 8, illus.
A report of delayed bud burst and of distorted foliage in various plants which had been sprayed in the previous autumn with the sodium salt of 2,4-D. The remarkably localized effect of delayed 2,4-D action suggests that it is probably associated with direct contact with 2,4-D spray rather than vapour. Failure to obtain symptoms of 2,4-D injury from spraying dormant twigs in winter suggests that absorption through the leaf or other succulent tissue of the stem is necessary.—Cornell Univ.

2659. CARLSON, R. F., AND MOULTON, J. E. 632.954: 634.75 + 634.711
Use of the ammonium salt of trichloroacetate, the sodium salt of trichloroacetate, ammonium thiocyanate, and herbicide " PB ", in the eradication of grasses, and the effect of these chemicals on strawberry and raspberry plants.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **38**: 413-21, bibl. 8.
Both the ammonium and sodium salts of trichloroacetate (TCA) gave slow but effective control of couch grass, *Agropyron repens*, and Kentucky bluegrass, *Poa pratensis*, under greenhouse conditions, if applied at the rates of 150-200 lb. per acre in the case of well-established grass and of 40-80 lb. per acre in the case of young growth. After a gradual colour change the leaves became chlorotic and withered 4 weeks after treatment. Other herbicides tested were ammonium thiocyanate, which proved less effective than the two salts of TCA, and " PB ", a product of the B. F. Goodrich Chemical Company, the composition of which is not stated. The latter killed broad-leaved weeds without injuring the grasses. While strawberries were killed by the TCA salts when applied at herbicidal strength, raspberry plants recovered from a dormant spray at 1,500 p.p.m. and a foliage spray at 1,000 p.p.m. Successive plantings of red kidney beans showed that the ammonium

salt of TCA has a residual toxic effect in moist soil lasting 40-50 days.

Noted.

2660.

a ALLEN, T. C. 632.6/7: 577.17
Suppression of insect damage by means of plant hormones.
J. econ. Ent., 1947, **40**: 814-7, bibl. 34.
A discussion of the possibilities.

b ANON. 632.951.8: 634.1/8
Forsøg med Vintersprøjtevaedsker til Frugttraeer. **(Trials with winter washes for fruit trees.)**
Dansk Havebrug, 1948, **6**: 19, being *Meddel. Statens Forsøgsvirks. Plantekult.* **407.**

c ANON. 634.1-2.95
Sprøjtning af Aeble- og Paeretraeer. **(Apple and pear spraying.)**
Dansk Havebrug, 1948, **6**: 40-2, being *Meddel. Statens Forsøgsvirks. Plantekult.* **122.**

d BORDEN, A. D. 634.13-2.951
DDT dust deposit on pears.
J. econ. Ent., 1947, **40**: 926-7.

e BRITISH ASSOCIATION. 632.951
Insecticides: report of a discussion.
Advancement of Science, 1948, **5**: 89-95.
The following papers were presented at the 1947 meeting:—
Gimingham, C. T.
Insecticides in agriculture (pp. 89-92).
Munro, J. W.
The place of insecticides in food protection (p. 92).
Gunn, J. L.
Experiments with aircraft in the control of locusts and other insects (pp. 92-4).
Potter, C.
Some biological problems in the study of insecticides (p. 94).
Wigglesworth, V. B.
The contribution of insect physiology to the study of insecticides (pp. 94-5).

f FRANSEN, J. J. 632.951
Biologisch onderzoek van derrispreparaten met behulp van vissen. **(The estimation of the active principles in derris preparations using fish.)** [English summary 10 ll.]
Landbouwk. Tijdschr., 1948, **60**: 228-36, bibl. 4.

g GADDUM, E. W. 615.779.1: 632.4
Ramularia bud disease [of pyrethrum in Kenya] 1947.
Kenya Pyrethrum News, 1948, **3**: 1: 6.
A preliminary report.

h GARLICK, W. G. 632.78
A five-year field study of codling moth larval habits and adult emergence.
Sci. Agric., 1948, **28**: 273-92, bibl. 5.
At Vineland, Ontario.

i HAZEN, A. C., AND FULTON, R. A. 615.779.1: 632.951
A method for the determination of Freon-insoluble matter in pyrethrum extracts.
Publ. U.S. Dep. Agric. Bur. Ent. Pl. Quar. **ET-257**, 1948, 4 pp.

j HERMANN, F. J. 632.951
Studies in Lonchocarpus and related genera. Parts I, II and III.
J. Wash. Acad. Sci., 1947, **37**: 427-30, bibl. 5; 1948, **38**: 11-4, bibl. 17, and 72-5.

k KEITT, G. W., LEBEN, C., AND SHAY, J. R. 634.11-2.42
***Venturia inaequalis* (Cke.) Wint. IV. Further studies on the inheritance of pathogenicity.**
Amer. J. Bot., 1948, **35**: 334-6, bibl. 9.

l KIRIUKHIN, G. 632.77
Some Aleurodidae of Iran. [Iranian with French summary 3 pp.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran, No. 5, 1947, pp. 22-8, bibl. 3, illus.

m LEBEN, C., AND KEITT, G. W. 634.11-2.42
***Venturia inaequalis* (Cke.) Wint. V. The influence of carbon and nitrogen sources and vitamins on growth *in vitro*.**
Amer. J. Bot., 1948, **35**: 337-43, bibl. 17, illus.

n MA, T. C., AND WU, L. C. 634.13-2.6/7
Observations on the insect community of Fukien pear trees in winter. [Chinese.]
Fukien agric. J., 1947, **8**: 1-2: 16-24.

o MCDONALD, J. E., AND FUDGE, J. F. 632.95(764)
Commercial insecticides and fungicides in Texas, 1946-1947.
Circ. Tex. agric. Exp. Stat. **118**, 1947, 11 pp.

p MARKHAM, R., MATTHEWS, R. E. F., AND SMITH, K. M. 632.8: 635.12
Specific crystalline protein and nucleoprotein from a plant virus having insect vectors.
Nature, 1948, **162**: 88-90, bibl. 6.

q MERRILL, T. A. 631.589: 631.8
A system aiding diagnosis of nutrient deficiencies in fruit trees. (A preliminary report.)
Proc. Amer. Soc. hort. Sci., 1948, **51**: 48-50.
Describes the use of a pressure tank for injection work.

r MILAD, Y. 632.191
Physiological studies in lime-induced chlorosis.
Bull. hort. Sect. Minist. Agric. Egypt **211**, 1939, pp. 56, bibl. 71, illus. [received 1948].
Work actually carried out in 1925-1927.

s ORTEGA, J. C. 634.51-2.78
Codling moth on walnuts. Southern California studies of varying methods of DDT application.
Calif. Agric., 1948, **2**: 7: 4, 14.

t PICKETT, B. S. 634.25: 632.95: 581.12
Respiration of peach leaves as influenced by some spray materials.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 196-8, bibl. 8.

u SCHMIDT, C. T. 632.944
Dispersion of fumigants through soil.
J. econ. Ent., 1947, **40**: 829-37, bibl. 8, being *Tech. Pap. Univ. Hawaii Pineapple Res. Inst.* **166.**
Chloropicrin and D-D.

v SCURTI, J. 632.5
Chiave analitica per il riconoscimento delle piante infestanti attraverso i semi. **(A key for the determination of weeds by their seeds.)** [English summary 6 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.), *Suppl.* pp. I to XLV+20 plates.—Staz. chim. agrar. sper. Turin.

w SERVADEI, A., AND GRASSO, V. 634.23-2.654
Una delle cause del deperimento del ciliegio. La *Cicadella viridis* L. **(The incidence of and damage done to cherries in Italy by *Cicadella viridis*.)**
Riv. Ortofrutt. ital., 1948, **32**: 45-50, bibl. 2, illus.

x SMITH, L. M., AND STAFFORD, E. M. 634.8-2.654.2
The bud mite and the erineum mite of grapes.
Hilgardia, 1948, **18**: 317-34, illus.

y THOMAS, I. 633/635-2.753
Common names of *Aphididae*.
Ent. mon. Mag., 1948, **84**: 155-61.

z THOMPSON, W. R. 632.96: 632.78
A catalogue of the parasites and predators of insect pests. Section 1. Parasite host catalogue. Part 9. Parasites of the Lepidoptera Q-Z.
Imperial Bureau of Biological Control, Belleville, Ont., Canada, 1947, pp. 627.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS.

(*See also* 2639-2659, 3121, 3125, 3126.)

Garden vegetables, general.

(*See also* 2362, 2366-2368, 2371, 2392e, k, p, r, u, 3090, 3093, 3101, 3110, 3113, 3130, 3131, 3136, 3137, 3139, 3147, 3148, 3154, 3155, 3159, 3160.)

2661. MINISTRY OF AGRICULTURE, LONDON. (WALLACE, T., SECRETT, F. A., AND BEWLEY, W. F.) 635.1/7: 631.8
The manuring of commercial vegetable crops.
Growmore Bull. Minist. Agric., Lond., **6**, 1948, pp. 14, 4d.

The first edition of this bulletin was noted in *H.A.*, 12: 910. The modified recommendations necessitated by wartime shortages have been revised to take account of present difficulties, particularly in the supply of organic nitrogen and sulphate of potash.

2662. WELLENSIEK, S. J. 635.1/7: 631.521: 631.532/5
Vegetatieve vermeerdering bij de veredeling, speciaal van groentegewassen. **(Vegetative reproduction as part of breeding technique, especially with vegetables.)** [English summary ½ p.]
Reprint from *Meded. Inst. Vered. Tuinbgew.* No. 8, 1948, pp. 57-71, illus.

The vegetative reproduction of most vegetables appears to be possible once correct methods are evolved. The vegetative reproduction of annuals or biennials, without the clone plants dying after the fruit ripens, is made possible in some cases by regulating temperature and day-length and so suppressing flower initiation. Vegetative reproduction may be applied to (1) the reproduction of plants which cannot be propagated from seed, (2) reproduction of valuable material of which little seed is available, (3) improvement of selection by the clone method, (4) vegetative reproduction of superior mother-plants, (5) production of heterotic seed by permanently propagating the necessary parents vegetatively; first generation hybrids may also be propagated vegetatively, and (6) new breeding methods of cross-fertilizers by mass test crosses, combined with vegetative reproduction and inbreeding of pair crosses.

2663. GERICKE, S. 635.1/7
Der Gemüsewert als Grundlage für die Bewertung der Gemüseernten. **("Vegetable value"* as a basis for the evaluation of vegetable crops.)**
Ceres, Hamburg, 1948, No. 2/4, pp. 29-31, bibl. 1.

For some time it has been customary in Germany to express the calorific value of an agricultural crop in terms of "cereal value" or "starch value" (Getreidewert, Stärkewert), i.e. the calorific value of 100 kg. cereal grain. The common denominator has the advantage of allowing any two crops to be compared. The author wants to extend this practice to vegetables and he suggests the introduction of "vegetable value". In agreement with "cereal value", the amount of vegetables possessing a calorific value of 3,000 would have a "vegetable value" of 1 kg., which corresponds to a "starch value" of 0·7 kg. Data on "vegetable value" and other figures related to it are tabulated for 40 vegetables. They show, for instance, that carrots and onions give a higher yield in "vegetable value" per area than cabbage, though they yield less by weight. All vegetables taken together—in the proportion in which they were grown in Germany in 1937—would yield a "vegetable value" of 18·1 quintals per hectare, as against 54·6 quintals for potatoes. Further figures relate to the effects of manuring on "vegetable value".

* See also 3110.

2664. SCHUPHAN, W. 635.1/7
Kritik der Gemüsebewertung auf der Grundlage des Getreidewertes. **(A criticism of vegetable evaluation on the basis of "cereal value".)**
Ceres, Hamburg, 1948, No. 2/4, pp. 32-6, bibl. 2.

The author contends that the evaluation of vegetables on the basis of their starch content fails to do justice to their significance as a source of vitamins and protein. In a book now published,* Schuphan suggests therefore that evaluation should be based on two calorific and two non-calorific factors, viz. (1) calorie, (2) pure protein content in per cent., (3) vitamin C content and (4) provitamin A or carotene content, the latter two in mg. %. In this system of ranking, kale receives the highest place of about 90 vegetables analysed and it is used as the "vegetable unit" (Gemüseeinheit), expressed as 1. Chicory and Swiss chard rank lowest with 0·30. In order to compare different crops, yields in weight per hectare are multiplied by the so-called "evaluation factor" (=fraction of 1 vegetable unit). Thus, for instance, a crop of 750 quintals per hectare of the cabbage variety September, multiplied by the evaluation factor 0·49, is put down as 368 quintals, as compared with, say, late carrots, 429 quintals (650 quintals×0·66). In intensive vegetable growing all the crops grown in succession in one season are considered together so that, for instance, from an early cabbage crop, two spinach crops and endive a "yield" of 656 quintals per hectare is obtained. The tabulated data on calorific value, protein,—vitamin C—and vitamin A—content of about 90 vegetables, from which their evaluation factor is calculated, are based on large numbers of analyses carried out for many seasons.

2665. SQUIBBS, F. L. 631.531: 635.1/7(393)
Commercial seedgrowing in Cyprus.
Crown Colon., Aug. 1948, pp. 430-1, illus.

A popular, illustrated account of a new and promising industry which in 1947 exported £38,000 worth of vegetable seeds to the United Kingdom, mainly cauliflower, broccoli and lettuce, with small quantities of carrot, tomato, cucumber, onions, leeks and radishes. It is hoped to develop flower seed production.

2666. GUSTAFSON, F. G. 581.035: 577.16
Influence of light intensity upon the concentration of thiamin and riboflavin in plants.
Plant Physiol., 1948, **23**: 373-8, bibl. 7, being *Pap. Dep. Bot. Univ. Mich.* **852.**

High light intensity increased the concentration of thiamin, and to a lesser degree that of riboflavin, in the following plants: tomato, potato, bean, pea, corn and New Zealand spinach.

* See review, abstr. 3110.

2667. GERICKE, S. 635.1/7: 631.86
Stallmistdüngung im Gemüsebau. **(The application of stable manure in vegetable growing.)**
Ceres, Hamburg, 1948, No. 1, pp. 11-13.

Figures are given in respect of and conclusions are drawn from manurial trials with vegetables, carried out for 9 years on a neutral sand soil, apparently at Berlin-Dahlem. In addition to a complete mineral fertilizer, stable manure was applied every 3 years at the rate of 400 quintals per hectare. On the average, the following increases in yield were obtained as the result of the stable manure applications: cucumber, 81·3%; cabbages, 23·5%; potato, 21·8%; legumes, 20·8%; tomato, 19·6%; leaf vegetables, 15·3%; root vegetables, 9·2%. No increase is noted for carrot, celeriac and leek; these crops should therefore be grown in the third year of the rotation. Cucumber, cabbages, perhaps peas, are recommended for the first year, while the rest of the vegetables, especially legumes, are considered suitable for the second year after an application of stable manure. Comparative figures show that vegetables derive a much higher benefit from stable manure than agricultural crops. This is partly due to the higher nutrient requirements of vegetables and partly to the nearly 3 times greater humus supply from plant matter remaining in the soil after the harvest of an agricultural crop. The figures presented, apart from those quoted above, illustrate the after-effect of stable manure applications, the contribution of stable manure to the total supply of nutrients, the utilization of the stable manure constituents by vegetables, and the significance of stable manure for the humus content of the soil.

2668. LUCAS, R. E. 635.1/7: 631.811.9: 546.56
Effect of copper fertilization on carotene, ascorbic acid, protein, and copper contents of plants grown on organic soils.
Soil Sci., 1948, **65**: 461-9, bibl. 14.

Plants used included spinach, onion, carrot, and lettuce. The data obtained indicated that plants grown in soils deficient in copper contained one-fourth to one-half as much copper as plants grown on copper-fertilized soil. In greenhouse trials the application of copper to deficient soils increased the ascorbic acid content of some plants but not of others (e.g. tomato fruit), and increased the carotene content of wheat, spinach, barley, carrots and oats. The protein content of plants deficient in copper was found to be abnormally high.

2669. MILLER, P. R. 632.4
The research and marketing act crop plant disease forecasting project.
Plant Dis. Reptr, 1948, **32**: 160-6.

The purpose of the project is explained and its operation described. It is now functioning as a warning service for late blight (*Phytophthora infestans*) of potato and tomato, blue mould or downy mildew of tobacco (*Peronospora tabacina*), and downy mildew of cucurbit crops (*Pseudoperonospora cubensis*). During seasons when the diseases are inactive it will save money; when the diseases are rampant, it will save crops. In both cases it will save energy. The article is followed by progress reports on the three diseases mentioned, summarized from reports of Warning Service Key Pathologists.

2670. CONNER, J. T. 635.1/7: 632.6/7
Vegetable insect control in North Carolina.
Ext. Circ. N.C. Coll. Agric. Engng **313**, 1948, 19 pp., illus.

The chief insect pests of vegetables in North Carolina are described and shown in 15 coloured illustrations. The need for sanitation, clean cultivation and the destruction of hibernating places is emphasized, and formulae of materials used for dusting and spraying are tabulated with the pests for which they are applicable.

2671. BENNETT, S. H., AND MARTIN, H. 632.951
The qualitative examination of insecticidal properties.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 147-56, bibl. 11.

Among insecticides examined are the gamma isomer of benzene hexachloride, the chlorinated dicyclopentadiene and terpene known respectively as "Chlordane" and "Toxaphene", *para*-nitrophenyl diethyl thiophosphate, hexaethyl tetraphosphate, and bis (β-fluoroethoxy) methane.

2672. DAME, F. 632.951
Erfahrungen über Schädlingsbekämpfung mit Gesarol und Hexachlorid-Präparaten in den Jahren 1946 und 1947. **(Experiences in pest control with Gesarol and hexachloride preparations made in 1946 and 1947.)**
Ceres, Hamburg, 1948, No. 5/6, pp. 16-7, bibl. 1.

The following results are recorded: (1) The Bladan preparation E605, at 0·01% or as a dust, achieved a 100% kill of 8 named aphid species, including some of great vitality. (2) Infestation of bean and pea seedlings and of other leguminous crops by the pea leaf weevil, *Sitona lineata*, was heavy in May, 1946, amounting to 3 weevils per cm^2. Dusting with Gesarol at the rate of 20 kg. per hectare controlled the pest and the plants recovered, while the number of plants in untreated check plots was halved in 7 days. (3) Further successes with stated amounts of Gesarol relate to flea beetle, diamond back moth, the imported cabbage worm (*Pieris rapae*), and asparagus beetle, whereas it gave disappointing results against gamma moth, *Athalica colibri* on cauliflower, cabbage and turnips and against scale insects on yew. (4) E605 gave complete control of scale insects on yew, further of thrips on gloxinia and cyclamen and—most important of all—of onion fly. The larvae are all killed by a single watering of the rows with a 0·05% solution.

2673. GAST, A. 635.1/7: 632.753
Gesafid im Gemüsebau. **(The control of aphids in vegetables by Gesafid.)**
Gärtnermeister, 1948, **51**: 218-20.

The new Geigy product Gesafid, a true emulsion, is said to be particularly useful for ornamental plants because of the absence of any visible residue. In addition to the pests controlled by DDT, it is effective against leaf aphids and woolly aphid. In the trials recorded in this paper kills of cabbage aphid, *Brevicoryne brassicae*, in 3 brassica crops were practically complete following 4 applications of 0·5% Gesafid. In this respect and in regard of residual effect the new insecticide compared very favourably with a 5% nicotine preparation applied at a concentration of 1·5%. Total yields and average weight per head of cabbage showed corresponding increases over controls and nicotine treated plots. No spreader is required with Gesafid.

2674. KANERVO, V. 635.1/7: 632.78
Über das Massenauftreten der Gammaeule, *Phytometra gamma* L. (Lep., *Noctuidae*), im Sommer 1946 in Finnland. **(On the mass incidence of the gamma moth, *Phytometra gamma* L., in Finland in the summer of 1946.)**
Ann. ent. Fenn, 1947, **13**: 89-104, bibl. 7.

Among the horticultural crops attacked by gamma moth larvae, peas suffered the worst damage, but also large areas of lettuce, carrot, and cabbage were eaten bare, while losses were somewhat less severe in potato, cucumber, spinach, onion, bean, soybean, and parsley. The ravages of the pest were accompanied by certain beneficial effects, viz. they extended their devastating activities to weeds and they helped pollination in some seed crops.

2675. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W. 635.1/7: 632.76
The vegetable weevil (*Listroderes obliquus*).
Agric. Gaz. N.S.W., 1948, **59**: 308, 313, illus.

The larvae of *Listroderes obliquus* attack practically all winter vegetables. Large irregular holes are eaten in the leaves, and the new growth of the crowns may be eaten away as it develops. Carrots, beetroot, turnips, etc., may be damaged below the ground. Clean cultivation is important. Ground suspected of being infested should be baited before planting out. Tuber and root plants, the leaves of which are not used as food, may be sprayed or dusted with preparations of DDT or lead arsenate.

2676. (Committee on Insect Pests, Saskatchewan.) 632.728
Grasshopper control in Saskatchewan.
Processed Publ. Div. Ent. Canad. Dep. Agric. **75,** 1948, 5 pp.

Grasshoppers periodically cause damage to crops and gardens in Saskatchewan. A grasshopper forecast is made each autumn and information is provided on methods of control. These involve thorough tillage, destroying the insects while preparing new summer fallow, and the use of poison baits. Sprays or dusts, such as chlordane or chlorinated camphene, although more expensive than bait, may also be used.

Garden vegetables, particular.

(*See also* 2355, 2376, 2385, 2387, 2392t, 2616, 2764, 3057.)

2677. Plantenziektenkundige Dienst, Wageningen. 632.76: 635.12
De bestrijding van aardvlooien in winterkoolzaad en knolzaad. **(The control of flea-beetles in wintergreens and turnips.)**
Bericht PlZiektkund. Dienst **777,** 1948, 1 p.

Brief notes on the control of *Phyllotreta* sp. and *Psylliodes chrysocephala* by rotenone, or by preparations containing DDT or HCCH.

2678. KenKnight, G., and Blodgett, E. C. 635.13: 631.531:632.4
A survey of the diseases of the carrot seed crop in Idaho with control recommendations.
Bull. Idaho agric. Exp. Stat. **262,** 1945, pp. 23, bibl. 15, illus. [received 1948].

Disease control measures include: clean roots; clean seed (hot water treated); at least a 4-year rotation avoiding lettuce, beans, peas, or celery as preceding crop; location as far as possible from any carrot, parsnip, or lettuce seed crop; removal of weeds; avoiding flooding and excess irrigation; sanitary measures; measures to prevent spread of rot in store; adequate ventilation; storage temperature near freezing; and the burial of culls under at least 6 inches of soil.

2679. van Hiele, T. 635.25: 664.84.25
Onderzoek naar de bewaarbaarheid van verschillende uienrassen. **(The keeping qualities of onion varieties, 1946/47.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1948, **11**: 439-43.

The results of trials described are tabulated for 10 varieties of onion. The onions kept much better with less sprouting at —1·5° than at 0° C. Sprouting by retention in ordinary store until 25 March, and then at —1·5° C. was not so thoroughly checked as in a constant temperature of 0° C.

2680. Anon. 635.31
Kulturforsøg med Asparges. **(Cultural trials with asparagus.)**
Dansk Havebrug, 1948, **6**: 54, being *Meddel. Statens Forsøgsvirks. Plantekult.* **420.**

Asparagus trials were carried out in the sand soil of Spangsbjerg from 1939 to 1947, with the main object of determining optimum planting distance. The tables show that large-scale plantings require a distance between rows of 2 m., a distance of 1·5 m. being recommended for gardens, where the beds are set up by hand. In the rows the plants should be set 30-35 cm. apart. In another trial blanched and unblanched green asparagus were compared. The yield of the former was lower, 27·0 kg. per 100 m² against 36·7 kg., so was the number of shoots, 1,305 per 100 m² against 2,361, but the weight of individual blanched shoots was higher, 2·07 kg. per 100 shoots against 1·55 kg.

2681. Musil, A. F. 635.34/35
Distinguishing the species of *Brassica* by their seed.
Misc. Publ. U.S. Dep. Agric. **643,** 1948, pp. 35, bibl. 60, illus.

The descriptions of the species and of their seed are accompanied by illustrations. A key for seed identification is provided.

2682. Work, P. 635.34: 631.531
Where cabbage seed grows.
Market Gr. J., 1948, **77**: 8: 5, 26-7.

An account of the commercial production of cabbage seed in the Puget Sound area of Washington. To reduce the problem of virus disease seedlings are raised in the hill country. The average yield is 805 lb./acre.

2683. Statens Forsøgsvirksomhed for Plantekultur. 635.34
Forsøg med Stammer af tidlig Vinter-Hvidkaal 1944-46. **(Early winter cabbage variety trials [in Denmark] 1944-46.)**
Dansk Havebrug, 1948, **7**: 149-51, being *Meddel. Statens Forsøgsvirks. Plantekult.* **408.**

Seven of the early winter cabbage varieties tested at the four Danish research stations proved to be very valuable for cutting from early autumn to about 1 January. Detailed specifications, as regards quality, yields, etc., are tabulated.

2684. Anon. 635.34
Forsøg med tidling Vinter-Rødkaal 1944-46. **(Early winter red cabbage trials, 1944-46.)**
Dansk Havebrug, 1948, **7**: 139-40, being *Meddel. Statens Forsøgsvirks. Plantekult.* **406.**

Tabulated data on variety trials carried out at Blangsted, Virum, Hornum and Spangsbjerg.

2685. Castle, R. B. 635.34: 631.84
Nitrogenous top dressing of spring cabbage.
Agriculture, Lond., 1948, **55**: 265-6.

An account of an experiment comparing the effect of nitrate of soda applied in autumn and/or spring on the growth and yield of 4 varieties of spring cabbage in the 1947-48 season. The application of nitrogen in the autumn markedly increased the loss of plants in winter but produced no significant effect upon final yield. Spring application of the fertilizer, however, resulted in over four times the total yield of marketable greens given by the control. Before any general conclusion is permissible, the experiment would have to be repeated on a variety of soils and over successive seasons.—Reading Univ. Hort. Stat.

2686. Walker, J. C., and Jolivette, J. P. 635.34: 632.48
Yellows-resistant varieties of cabbage in the early and midseason roundhead groups.
Circ. U.S. Dep. Agric. **775,** 1948, pp. 20, bibl. 12.

The performance and characteristics of 5 cabbage varieties resistant to *Fusarium oxysporum f. conglutinans*, are described in comparison with a representative strain of Golden Acre as the standard variety. The testing was carried out at Madison, Wis.

2687. de Wilde, J. 635.34: 632.77
Naar een doeltreffende bestrijding van de koolvlieg (*Chortophila brassicae* Bché). **(An efficient control of the cabbage fly.)**
Tuinbouw, 1948, **3**: 101-3.

The life history of the cabbage fly and control measures are

outlined. The most effective means of control is 1% corrosive sublimate, about 150 c.c. per plant, applied as soon as the insect's eggs are observed, and repeated after 14 days. DDT emulsions (at not less than 0·05%) also give good results; illustrations show treated and untreated plots.

2688. MINISTRY OF AGRICULTURE, LONDON. 635.35
Cauliflowers.
Bull. Minist. Agric. Lond. **131**, 1948, 2nd edition, pp. 18, 9d.

For an abstract of the first edition see *H.A.*, 16: 2096. In the second edition recommendations on pest control include the use of DDT, and a description of summer and autumn cauliflower growing in Pembrokeshire is added to the chapter " Local practices ".

2689. DOESBURG, J. J., AND ZWEEDE, A. K. 635.41: 581.192
Verslag van een onderzoek naar het oxaalzuur-, kalk-, vitamine C en drogestofgehalte van een aantal spinazieselecties. **(Oxalic-acid, calcium, ascorbic acid and dry matter content of some spinach strains.)** [English and French summaries 15 ll.]
Voeding, 1948, **9**: 12-25.

By inspection it was possible to separate 31 Dutch spinach strains into two groups, typified by Amsterdams reuzenblad [Amsterdam giantleaf] and Breedblad scherpzaad zomerspinazie [broadleaved prickly summer spinach]: the first group had significantly higher contents of oxalic acid, calcium, and dry matter.

2690. RICHARDSON, A. M. 635.52
Summer lettuce varieties in the Toowoomba District [Queensland].
Qd agric. J., 1948, **66**: 158-9.

In the trial described the variety Great Lakes appeared to be slightly superior to Imperial 847 and Imperial 44, and Imperial 44 rather better than Imperial 847. Iceberg was definitely unsatisfactory, while American Summer was useless.

2691. ANON. 635.52
Progress, a new variety of head lettuce.
Market Gr. J., 1948, **77**: 9: 12, illus.

Progress is an early, dark green, thick-leaved, heavily savoyed, tipburn-resistant, crisphead lettuce of good flavour and high quality. It was derived from Imperial 44, which it resembles.—B.P.I.S.A.E., U.S.D.A.

2692. BROWN, W., AND MONTGOMERY, N. 635.52
Problems in the cultivation of winter lettuce.
Ann. appl. Biol., 1948, **35**: 161-80.

The inferiority of the variety Trocadero Improved to such a winter variety as Imperial is due mainly to its susceptibility to *Pythium* root rot, which often causes severe thinning of Trocadero seedlings and dwarfing of many of the survivors. Late autumn plantings of Imperial and other winter varieties overwintered better on a medium-heavy loam than on a light sandy soil. Fungicidal treatment in the seed-bed of plants set out in the field in November gave little improvement in survival, but pronounced benefit was obtained by February or March dusting of seedlings which had overwintered in the seed-bed.—Imp. Coll. Sci. Tech., London.

2693. VLAMIS, J., AND JENNY, H. 635.52-2.19: 631.811.4
Calcium deficiency in serpentine soils as revealed by adsorbent technique.
Science, 1948, **107**: 549, bibl. 4.

Lettuce grown in serpentine soils with additions of NPK exhibited severe symptoms of a rosette disease which was shown to be due to calcium deficiency. Subsequently, the symptoms—stunting and curling of the young inner leaves—were reproduced in water culture.—University of California, Berkeley.

2694. WILD, H. 635.52-2.4
Downy mildew disease of the cultivated lettuce.
Trans. Brit. mycol. Soc., 1947, **31**: 112-25, bibl. 17.

An account of an investigation mainly concerned with the mode of transmission of the disease and its influence on the maturing of the crop.—Imp. Coll. Sci. Tech., London.

2695. TAYLOR, R. E., AND DILLON WESTON, W. A. R. 635.53: 632.4
Celery " blight ". The need for clean celery.
Agriculture. Lond., 1948, **55**: 201-3, bibl. 6.

Although the production of clean celery seed is practicable and a commercial proposition, a survey carried out in 1947 showed that seed bought at random from retail seedsmen in Great Britain contained a high percentage of leaf-spot infection, viz. 10-19 in 33% of the samples and 20-29 in 11% of the samples. In recent years, leaf-spot has caused serious damage to celery plant raisers and celery growers, particularly in the Isle of Ely. The introduction of a voluntary certification scheme of seed crops is suggested as a remedy.

2696. ORMAN, A. C. 635.615
The growing of watermelons.
Agric. Gaz. N.S.W., 1948, **59**: 190-2.

Watermelons may be grown successfully in most districts of New South Wales except the highlands where the season is too short and temperatures too low for best results. Warm coastal districts in the Central and North Coast divisions and the inland districts west of the Dividing Range provide the most suitable conditions. Notes are given on soils and preparation, sowing, varieties, harvesting and pest control. The most serious pests are aphids and pumpkin beetles. Aphids should be controlled with a spray of nicotine 1 fl. oz., white oil emulsion 6 fl. oz. in 4 gallons water. The beetles may be controlled by dusting the plants with derris dust or calcium arsenate 1 part mixed with 16 parts hydrated lime. Hydrated lime alone may be dusted on the plants to repel the beetles.

2697. MAO, HSING-HAN. 635.61/62
A systematic study of *Cucumis melo* L. in Lanchow [N. China]. [Chinese, English summary ¾ p.]
J. agric. Ass. China, 1947, No. 185, pp. 4, 17-26, bibl. 4.

Six varieties of *Cucumis melo* are identified, their characteristics tabulated and a key to their identification given. These are *C. m. reticulatus*, *saccharinus*, *makuwa*, *dudiam*, *pseudo-cantalupensis*, and *lanchowensis*. The last two are newly named by the author. [From author's summary.]

2698. IVANOFF, S. S. 635.611: 581.162.3
Natural self-pollination in cantaloupes.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 314-6, bibl. 1, being *Tech. Pap. Tex. agric. Exp. Stat.* **1038.**

The results are given of a trial to determine the extent of natural self-pollination in 4 cantaloupe vines of a green-fleshed variety (recessive) exposed on all sides to possible pollination from a salmon-fleshed variety (dominant). Self-pollination was determined by the colour of the fruit flesh in the following season. The percentage of self-pollinated fruits for the 4 vines was 98·6, 75·7, 0 and 0. These differences were " probably due to some special conditions during pollination ".—Texas.

2699. WÖLFER, —. 635.61
Freiland-Melone " Volltreffer ". **(The outdoor melon " Volltreffer ".)**
Gärtnermeister, 1948, **51**: 100-1.

This new melon variety matures fully in the open in Switzerland, and not only in especially favourable locations; its culture has been successful at altitudes above 900 m. A single plant produces up to 15 fruits of 1-2 kg., the yield per hectare being 300 quintals.

2700. Ellis, D. E., and Cox, R. S. 635.63: 632.952
Dusting cucumbers to control downy mildew.
Bull. N.C. agric. Exp. Stat. **362**, 1948, 16 pp., bibl. 13.

The control measures recommended for the control of downy mildew of cucumber, *Peronoplasmopara cubensis*, include the use of tribasic copper sulphate dust, containing 5% metallic copper, in a suitable diluent such as pyrophyllite or talc applied not less than once every 10 days and also after each rain (¼ inch or more), heavy enough to wash off the dust, the applications being 15 to 20 lb. per acre early in the season when plants are small, and 35 to 50 lb. per acre later. Results of trials are tabulated and illustrated by 5 colour photographs.

2701. Fikry, A. 635.62: 632.952
Effect of various brands of sulphur on the control of powdery mildew of *Cucurbitaceae*.
Bull. tech. sci. Serv. Pl. Path. Sect., Minist. Agric. Egypt, **248**, 1948, 33 pp., bibl. 4.

Previous work on the use of Sicilian sulphur for the control of powdery mildew of cucurbits [*Erysiphe cichoracearum* DC (*H.A.*, 7: 928)] is reviewed, and the different brands of sulphur, inerts and mixtures are described. Sicilian sulphur, Gaza sulphur, gypsum sulphur, soufre noir, soufre gris, and ground spent oxide (a by-product of gas works), all satisfactorily controlled the mildew. Mixtures of sulphur and inerts, 1 part to 3, gave efficient control. Brands of sulphur and mixtures containing over 20% sulphur increased yield in vegetable marrows.

2702. Pound, G. S., and Walker, J. C. 635.63: 632.8
Strains of cucumber mosaic virus pathogenic on crucifers.
J. agric. Res., 1948, **77**: 1-12, bibl. 13.

A mosaic disease of dame's violet (*Hesperis matronalis* L.) an ornamental crucifer, is caused by two viruses identified as strains of cucumber virus 1. Both viruses are widely pathogenic on cruciferous plants but only on dame's violet are conspicuous symptoms produced. One of the two viruses was shown to immunize effectively zinnia plants against Price's No. 6 strain of cucumber virus 1.

2703. Behr, L. 635.63: 577.17
Die Wirkung übernormaler Dosen des Beizmittels. "Ceresan" auf den Keimvorgang von *Cucumis sativus* L. **(The effect of excessive doses of Ceresan on the germination of *Cucumis sativus*, the cucumber.)**
Züchter, 1946, **17/18**: 44-50, bibl. 11, illus.

Effects included tumour formation and ageotropism exhibited by the root.

2704. Ministry of Agriculture (Bewley, W. F., and others). 635.64
Tomatoes.
Bull. Minist. Agric. Lond. **77**, 2nd edition, 1948, pp. 67, bibl. 14, illus.

This guide to the commercial cultivation of tomatoes is mainly devoted to growing them in glasshouses erected for the purpose, but it also includes information on cultivation in the open, in cucumber houses, and in pots moved into glasshouses in September. In discussing the effect of temperature on the growth and fertility of tomatoes, the authors emphasize the beneficial effects of soil heating. The identification and control of pests and disease are described. The bulletin is full of useful, practical advice.

2705. Young, P. A., and MacArthur, J. W. 635.64
Horticultural characters of tomatoes.
Bull. Tex. agric. Exp. Stat. **698**, 1947, pp. 61, bibl. 113, illus.

To facilitate the work of the breeder, descriptions are given of 49 tomato characters with named genes and more than 60 without identified genes.—Tomato Disease Laboratory Jacksonville, Texas and University of Toronto.

2706. Andrus, C. F. 635.64
Southland may have something for the north.
Market Gr. J., 1948, **77**: 9: 12.

Southland is a new general purpose red tomato, resistant to collar rot and early blight, moderately resistant to late blight, and almost immune to fusarium wilt. It was developed at the Regional Vegetable Breeding Laboratory, Charleston, S.C., and has been tested extensively in the southern states.

2707. Mullett, R. A. 635.64
Horticultural Research Station, Scoresby. Tomato field day.
J. Dep. Agric. Vict., 1948, **46**: 207-8.

This account of a field day briefly outlines the work on tomatoes on the Station. More than 200 varieties are being tested. Varieties on which detailed work is being carried out include: South Australian Dwarf, San Marzano, Orange Prolific, and Tatura Dwarf Globe. A cross between Break o' Day and King Humbert has resulted in a useful late variety of the Grosse Lisse type.

2708. Rick, C. M. 635.64: 581.162.3
The effect of planting design upon the amount of seed produced by male-sterile tomato plants as a result of natural cross-pollination.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 273-84, bibl. 8.

The production of fruits and seeds by male-sterile plants varied according to the distance between fertile and sterile branches. The highest yield per plant of hybrid seed was obtained when fertile and male-sterile branches intermingled in an arrangement in which the two types of plants were spaced 6 inches apart in pairs, the pairs being set at the regular planting distance. The smaller growth of the plants resulting from these crowded conditions was offset by a significantly larger number of seeds per fruit, and a significantly larger proportion of flowers that set fruit. The great variability noted in seed yields per male-sterile plant and in other observations reveals certain aspects of the habit of the insects responsible for transferring tomato pollen. The bearing of these findings on the production of F_1 hybrid seed is discussed. [From author's summary.]—Univ. of California.

2709. Currence, T. M. 635.64: 519
Studies related to field plot technique with tomatoes.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 290-6, being *Pap. sci. J. Ser., Minn. agric. Exp. Stat.* **2333**.

Studies are reported on the efficiency of different sizes and shapes of plots for tomatoes, and a comparison of individual plant yields for 3 varieties grown at 5 spacings and with 3 types of training.—Univ. of Minnesota.

2710. Baldoni, R. 635.64: 631.523
Esperienza sull'utilizzazione dell'eterosi nella coltivazione del pomodoro. **(Utilization of heterosis in tomato production.)** [English summary 11 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 3-20, bibl. 29.

Italian trials show the value of first generation crosses in tomatoes. Production was appreciably greater and better distributed over the summer, though not always earlier. The costs are more than covered by increased yields.—Univ. Bologna.

2711. Roever, W. E. 635.64
A promising type of male sterility for use in hybrid tomato seed production.
Science, 1948, **107**: 506.

In the tomato variety John Baer a male-sterile mutant has

been found, which can be maintained as a pure line through hand pollination and used as a female parent in hybrid seed production. It appears that the character behaves as a simple recessive and that it may be easily incorporated into other desirable parental lines. Apart from the improvements in pollen collection and application, the discovery promises to lead to a great expansion in the use of hybrid tomatoes.—West Tennessee Experiment Station.

2712. Bohn, G. W. 635.64
Sesquidiploid F_1 hybrids of *Lycopersicon esculentum* and *L. peruvianum*.
J. agric. Res., 1948, **77**: 33-53, bibl. 30.
The experiments described show that sesquidiploid F_1 hybrids, with 2 chromosome sets (24) from *Lycopersicon esculentum* and 1 chromosome set (12) from *L. peruvianum* can be obtained with relative ease. The sesquidiploid offers the possibility of obtaining an entirely different type of tomato.

2713. Lincoln, R. E. 635.64: 632.111
Frost hardiness in tomato species.
J. Hered., 1948, **39**: 143-4, bibl. 1, being *Contr. Purdue Univ. agric. Exp. Stat.*
A number of plants of *Lycopersicon peruvianum* were practically unaffected by a frost that killed most plants of *L. esculentum, L. pimpinellifolium, L. hirsutum*, hybrids of these species, and *L. glandulosum*. This striking difference in susceptibility to frost damage was only evident in one out of five seasons.

2714. Procter, C. H. 635.6: 631.531
Seed extraction with hydrochloric acid.
N.Z. J. Agric., 1948, **76**: 480.
Seed extracted by acid is cleaner and brighter than that extracted by fermentation, it has a consistently higher germination, the extraction time is reduced to 3 hours and the process is independent of temperature. Details are given for the extraction of tomato seeds, and there are notes on the application of the method for seeds of cucumber, passion fruit, and tree tomato.

2715. Ploper, J. 635.64: 581.143.26.03
Contribución preliminar del estudio sobre la vernalización aplicada al tomate. **(A preliminary contribution to the study of vernalization in tomato.)**
Bol. Estac. exp. agríc. Tucumán **63**, 1948, pp. 12, bibl. 17, illus.
The tomato variety Platense was used for experiments on vernalization. The most effective treatment was exposure of the germinating seeds to a temperature of 22° C. for 25 days; the seeds were kept in the dark in a petri dish in moist surroundings. This treatment led to increases, statistically significant, of 50% in the early crop and 44% in total crop.

2716. Barbini, M. E. 635.64
Preparacion de almacigos de tomates. **(Preparing tomato seed beds.)**
Rev. mens. B.A.P., 1947, **30**: 358: 4-5, illus.
These beds are $5 \times 1{\cdot}2$ m. and 60 cm. apart, and are protected when necessary with strips of matting, which, when not in use, are rolled up and placed at the south end of the (north to south) beds, as shelter against cold winds. When the second leaf of the seedlings appears the plants should be sprayed with ¼% " Gesarol Rojo ".

2717. Murneek, A. E. 635.64: 577.17
Results of further investigations on the use of hormone sprays in tomato culture.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 254-62, bibl. 5, being *J. Ser. Mo. agric. Exp. Stat.* **1043.**
The experiments reported verify and amplify the value of β-naphthoxyacetic (NOA) and *p*-chlorophenoxyacetic (CIPA) acids as " hormone " sprays for greenhouse-grown tomatoes. When used as a spray supplementary to pollination, CIPA has consistently given the greatest effect in increasing fruit set and size. The concentration of either substance, but especially of CIPA, must be adjusted according to the relative amount of light the plants are receiving. Of the three relatively new substituted benzoic and phenoxy acids tested, α (*o*-chlorophenoxy) propionic acid at 50 parts per million showed considerable merit as a hormone spray for greenhouse-grown tomatoes. We are obliged to conclude that hormone sprays are of no practical value for field cultivated tomatoes excepting possibly in regions or years of subnormal amount of sunlight. [From author's summary.]—Univ. of Missouri.

2718. van Koot, Y. 635.64: 577.17
Vruchtzetting bij tomaat en het gebruik van groeistoffen. **(Fruit set in tomato and the use of growth substances.)**
Tuinbouw, 1948, **3**: 122-5.
Favourable and unfavourable conditions for tomato fruit setting are set out, with reference to those conditions when application of growth promoting substances is desirable. The advantages and disadvantages of applying such substances are discussed. If they are used at too high a concentration, injury may be caused, e.g. a mosaic mottling of the leaves, warty outgrowths on the stems, greater susceptibility to *Botrytis* rot, and irregular colouring of the fruit. The chemical composition of the substances is not mentioned, but reference is made to two proprietary preparations.

2719. Mullison, W. R., and Mullison, E. 635.64: 577.17
Effects of several plant growth-regulators on fruit set, yield, and blossom-end rot of six tomato varieties grown under high temperatures.
Bot. Gaz, 1948, **109**: 501-6, bibl. 10.
When the minimum night temperature was not below 78° F., tomato plants grew well but set few fruits. A higher total yield of larger fruits was obtained by spraying the flowers with one of the following (in order of decreasing effectiveness): *p*-chlorophenoxyacetic acid, β-naphthoxyacetic acid, 2,4-D, α (*o*-chlorophenoxy) propionic acid. Of the six varieties tested, the indeterminate tomatoes were more responsive to treatment, but the determinate sorts were superior for fruit production during the tropical hot season. —Curaçao.

2720. Treccani, C. P. 577.17: 635.64 + 634.61
Effetti del sale sodico del 2-4 Diclorofenossiacetico sulla produzione di pomodori, zucchine e cocomeri. **(The effect of the sodium salt of 2,4-D on the production of tomatoes, marrows and water melons.)**
Ann. Sper. agrar., 1948, **2** (N.S.): 173-99, bibl. 11.
Spraying with 2,4-D at 10 p.p.m. resulted in parthenocarpic fruits. Normality in such fruits depended on prior pollination and fertilization, 2,4-D then inhibiting further development of seed. It did not produce parthenocarpic fruit in either marrows or water melons. Spraying in bloom with 2,4-D resulted in earlier ripening in marrows and later ripening in melons. In one uncontrolled trial parthenocarpic fruits were similarly obtained in eggplant.—Staz. sper. Ortifrutt. Milan.

2721. Maksimov, N. A. 635.64: 577.17
Controlling the growth and ripening of fruit by means of growth-regulating substances. [Russian.]
Vestn. Akad. Nauk. S.S.S.R., 1947, **17**: 8: 26-36.
The discovery and application of growth substances are reviewed and the chemical structures of seven of them are

set out. The author propounds a hypothesis to explain their action. The development of tomato fruits, after natural pollination and also when induced by the application of growth substances, is discussed. The results of experiments carried out by Ju. V. Rakitin are quoted and tabulated. By applying 2,4-D at a concentration of 10 mg. per litre the yield was doubled, and the fruits contained more sugar and vitamin C. It is pointed out, however, that 2,4-D is harmful to young leaves and shoots (" formative effect ") and these must be protected during the application. Other growth substances less harmful to the plants but also less effective than 2,4-D are mentioned. A table shows the recommended concentrations of five growth substances, states whether they produce the formative effect or not, and gives the cost per hectare of application to tomato plants. The use of ethylene in regulating the ripening of tomatoes is described, particularly with reference to increasing their storage life.

2722. Pollard, A., Kieser, M. E., and Bryan, J. D. 635.64: 581.192
Factors influencing the composition of the tomato.
J. Soc. chem. Ind. Lond., 1948, **67**: 281-3, bibl. 24.

Analyses of commercial tomato varieties carried out over four years have shown that differences in composition are to be ascribed to the effects of cultural treatment and variety. When grown under glass the fruit contained less ascorbic acid than when grown in the open, but it contained more sugar and was superior in flavour. Significant differences were found between the amounts of ascorbic acid, sugar and free acid in some of the varieties, and some of these relative differences were maintained in a later season. In 1947 all three constituents increased in concentration during the period of harvest, and ascorbic acid and free acid fell at the final picking. These changes were associated with drought during the period rather than with hours of sunshine or day temperature. Ascorbic acid production on an acreage basis was found to be determined by the cropping capacity of a variety rather than by fruit composition. [Authors' summary.]—Long Ashton Res. Station.

2723. Went, F. W. 635.64: 547.458
Sucrose utilization by the plant.
Science, 1948, **107**: 460, being abstract of Paper presented at 1948 Meeting of Nat. Acad. Sci.

Discusses the conditions under which sugar sprays are effective in increasing the growth of tomato plants.

2724. Brennan, E. G., and Shive, J. W. 635.64: 631.811.4 + 546.27
Effect of calcium and boron nutrition of the tomato on the relation between these elements in the tissues.
Soil Sci., 1948, **66**: 65-75, bibl. 12.

In a normal plant lower leaves contained more total and soluble boron than upper leaves. Lower and upper stems had about the same boron content, but much less than that found in leaf tissue. The effect of increase in the calcium concentration of the substrate varied. At a very low boron level (0·001 p.p.m.) it caused a decrease in the boron content of upper leaves but no definite effect on the other tissue fractions; at intermediate boron levels (0·10 and 0·25 p.p.m.) it produced no definite influence on the amount of boron accumulated in any tissue fraction; and at the highest boron level (5 p.p.m.) it generally caused a decrease in the boron content of each tissue fraction. Plants with external symptoms of boron deficiency contained little total and soluble boron in any of the tissues. Symptoms of boron deficiency were accentuated by a high calcium concentration in the substrate. Plants with external symptoms of boron toxicity showed very high content of total and soluble boron in all the tissues. Symptoms of boron toxicity on plants receiving low calcium in the substrate were more severe than on those receiving high calcium. The calcium-boron ratio in leaves of normal tomato plants ranged from 201 to 593, in leaves of boron-toxic plants from 30 to 114, and in leaves of boron-deficient plants from 1,000 to 2,380.

2725. Holmes, A. D., and others. 635.64: 631.875
Effect of different mulches upon the nutritive value of tomatoes.
Soil Sci., 1948, **65**: 471-5, bibl. 8.

In an experiment of 6 years' duration the effect of mulching on the composition of tomatoes was determined. Four-inch layers of three types of mulch—horse manure with shavings, rye straw, and Servall (shredded sugar-cane stalks)—were spread on the experimental plots when the plants were set out. In the last year samples were assayed. The water, total solids, total sugars, and ascorbic acid contents of the tomatoes were similar for the check and the mulched plots. The tomatoes from the mulched plots contained more soluble solids, carotene, calcium, magnesium, phosphorus, and potassium than those from the control plots.

2726. Tsui, C. 635.64: 631.811.9: 546.47
The effect of zinc on water relation and osmotic pressure of the tomato plant.
Amer. J. Bot., 1948, **35**: 309-11, bibl. 14, being *Contr. Dep. Bot. Univ. Mich.* **851.**

Tomato plants grown in zinc-deficient culture solution had a lower water content and a higher osmotic pressure, and grew less rapidly than plants receiving Zn.

2727. Hewitt, E. J., and Jones, E. W. 632.19: 546.77: 635.3/6
The production of molybdenum deficiency in plants in sand culture with special reference to tomato and brassica crops.
J. Pomol., 1947, **23**: 254-62, bibl. 22, illus.

A method is described for the study of molybdenum deficiency in plants grown in sand culture and a new method is outlined for the elimination of molybdenum from nutrient reagents. Severe symptoms caused by lack of molybdenum were observed in tomato, cauliflower, savoy cabbage and mustard. Injection methods to supply small amounts of molybdenum produced rapid recoveries in deficient plants. There was a marked accumulation of nitrate in the leaf (petiole) tissues and increased osmotic pressures in the stomatal guard cells of cauliflower, mustard and tomato plants from which molybdenum was withheld. Certain symptoms shown by molybdenum-deficient cauliflower plants appeared to be identical with the condition known as " Whiptail ". The distribution of deficiency effects in the tomato and in some cruciferous species is discussed in relation to their life histories and the mobility of molybdenum in these plants. [From authors' summary.]—Long Ashton Res. Stat., Bristol.

2728. Brenchley, W. E. 546.77: 631.543: 635.64
The toxic action of molybdenum in relation to soil and crops.
Ann. appl. Biol., 1948, **35**: 139-60, illus.

Results are recorded for tomato, *Solanum nodiflorum* and flax, grown in pots. Tomatoes in ordinary loam showed little outward sign of poisoning with heavy doses of sodium molybdate, but some depression of crop occasionally occurred. The response varied with season and variety. On certain light and fen soils the plants were killed at an early stage with the heavier dressing of molybdate and seriously injured with the lighter dose, the leaves showing the golden colour characteristic of molybdenum poisoning in various plants. On old cucumber soil tomatoes showed no sign of toxicity even with the heavy dressing.—Rothamsted Experimental Station.

2729. Goldschmidt, W. B. 635.64: 632.19
" Blue disease " of tomatoes.
Fmg S. Afr., 1948, **23**: 333-6, 344, illus.

In 1945 a peculiar dwarfing disease of tomatoes, here described, was reported in the Malelane area of the eastern Transvaal Lowveld. The poor availability of the phosphates in the soils of that area was suspected as a possible cause. Fertilizer trials are described. It is recommended, provisionally, that where the response to superphosphate is disappointing, growers should try a mixture of 1 part superphosphate with 2 parts fine-ground rock phosphate.

2730. BURGIS, D. S. 635.64: 632.19
Wilting of transplanted seedlings reduced by seedbed treatment.
Market Gr. J., 1948, **77**: 8: 21, 36.

Wilting was reduced when the tops of tomato seedlings were sprayed with 10% Geon (a synthetic latex) solution before transplanting or were dipped in the same material after removal from the seedbed. Elsewhere this material has been used to reduce the transpiration of shrubs in transplanting and of leafy cuttings.—Vegetable Crops Lab., Bradenton, Fla.

2731. MIDDLETON, J. T. 635.64: 632.8
The occurrence of big bud of tomato in southern California.
Plant Dis. Reptr, 1948, **32**: 92.

Observations indicate that the big bud virus and its vector or vectors are generally distributed throughout southern California, and that there would appear to be reservoirs of the virus other than tomato. The disease has been noted on all varieties of tomatoes grown commercially in this area.

2732. KRAMER, M. 635.64: 632.8
A transmissão experimental e a identificação de uma doença de vírus do tomateiro. **(Experimental transmission and identification of a virus disease of tomato.)**
O Biológico, 1947, **13**: 44-7, bibl. 5, illus.

This disease is distinct from yellow dwarf of tobacco and potato, which it resembles. On tomato the primary symptoms include vein clearing, chlorosis between the secondary veins, and leaf roll; later the main veins become violet, and new leaves are twisted, atrophied and yellow. Fruiting is reduced or suppressed. Symptoms caused by this virus in *Datura stramonium*, *Nicotiana glutinosa*, *N. tabacum* and *Petunia* are described.

2733. HOLMES, F. O. 635.64: 632.8
Resistance to spotted wilt in tomato.
Phytopathology, 1948, **38**: 467-73, bibl. 5, illus.

A heritable resistance adequate for the control of the New Jersey disease of tomato (caused by a virulent strain of the spotted wilt virus) was found in two kinds of South American tomato, the variety Rey de los Tempranos, and some lines of the variety Manzana, both from Argentina. The new type of resistance was inherited as a single Mendelian factor in crosses with the susceptible Rutgers variety of tomato.—The Rockefeller Institute, Princeton, New Jersey.

2734. THOMAS, H. R. 635.64: 632.4: 631.8
Effect of nitrogen, phosphorus, and potassium on susceptibility of tomatoes to *Alternaria solani*.
J. agric. Res., 1948, **76**: 289-306, bibl. 8, illus.

In two of the three experiments the plants grown at the high level of P, irrespective of N and K levels, had smaller leaf spots and a significantly smaller percentage of dead leaves than plants grown at a low-P level. Plants grown at the low level of N, irrespective of P and N levels, had smaller leaf spots than those at the high-N level. Plants grown at the low-K level, irrespective of N and P levels, had a smaller percentage of leaves dead and smaller leaf spots than those grown at a high level in two of the three series.

2735. STRONG, M. C. 635.64: 632.952
New fungicides for tomatoes.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 407-12.

The diseases, against which the fungicides were tested, are *Alternaria* and *Septoria* blights and anthracnose, i.e. *Colletotrichum phomoides*, late blight, *Phytophthora infestans*, having been practically absent during the experimental period, 1945-47. There was no relationship between yield and disease control, bordeaux ranking first as an anti-blight spray in each of the 3 seasons but having a depressing effect on yield. Phygon, the Dithanes and Parzate are named as offering dependable control of the blight diseases, but they are somewhat more expensive than the insoluble coppers or bordeaux. Fermate, Zerlate and Bioquin 1 were found to control tomato anthracnose effectively. Tabulated data give details of the experiments.

2736. REICHERT, I., PALTI, J., AND MOELLER, S. 635.64: 632.411
Spraying and dusting trials for tomato disease control.
Palestine J. Bot. (*R*), 1947, **6**: 188-200, bibl. 13.

An account of trials designed to evolve a disease control programme for two important tomato growing centres in Palestine.

2737. BROCK, R. D. 635.64: 632.48
The nature of *Fusarium* wilt resistance in the tomato variety Pan America.
J. Aust. Inst. agric. Sci., 1948, **14**: 78-80, bibl. 6.

It would appear that Pan America is resistant because it is able to check the growth of the pathogen and establish a state of equilibrium, rather than prevent its entry or localize it in the root system. The addition of a strong virus pathogen, Tomato Spotted Wilt, is sufficient to upset this equilibrium and reduce resistance to the extent that the fungus can grow into the above-ground portion of the plant.

2738. SUTTON, W. S. 635.64: 632.4
Early blight or target spot of tomatoes.
Agric. Gaz. N.S.W., 1948, **59**: 297-300, illus.

This tomato disease caused by *Alternaria solani* affects leaves, stems, fruit stalks, sepals and, later, the fruit, causing dark brown to black markings. It is found also on potatoes, eggplants and solanaceous weeds, which thus act as sources of infection for tomatoes. On seedlings it causes a collar rot. In the field it causes leaf spotting, and the older leaves rapidly die. The fungus cannot penetrate the skin of the fruit, and fruit lesions are confined to the region immediately adjacent to the fruit stalk scar. The disease is controlled by seed treatment, thin sowing, spraying, rotation, and collecting and burning all crop remains. Bordeaux mixture 2-2-40, applied at weekly intervals, is recommended; the stems as well as the leaves should be well wetted.

2739. BEACH, W. S. 635.64: 632.41
Zerlate followed by fixed copper spray controls tomato disease without injury.
Bull. Pa agric. Exp. Stat. **488**, *Suppl.* **3**, pp. 5-6; also *Market Gr. J.*, 1948, **77**: 8: 14, 24, 28.

Zerlate is the safest spray material for early applications on tomatoes and gives the best control of anthracnose. It does not give high control of late blight but disease is held in check until a change can be made to a copper fungicide. Three Zerlate sprays followed by two of tribasic copper sulphate gave the highest fruit number and weight for Rutgers, namely 50 fruits per plant and 15 tons of saleable fruit.—Pa agric. Exp. Stat.

2740. DORMAN, S. C., AND MINGES, P. A. 632.651.3: 632.944: 635.64
Results on the control of rootknot nematode in vegetable plant beds.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 317-20, bibl. 6, illus.

A report on replicated tests of D-D (contains chlorinated propylenes) as a soil fumigant for tomato and cabbage seedbeds. Fairly good control of rootknot nematode was obtained.—California.

2741. DE TOLEDO, A. A. 635.64: 632.78
Contribuição para o estudo da *Leucinodes elegantalis* Guén., praga do tomate. **(Contribution to the study of *Leucinodes elegantalis*, a tomato pest.)**
O Biológico, 1948, **14**: 103-8.
The common name of the caterpillar of this Pyraustid moth is tomato borer or tomato fruit borer. Larvae have been found in fruits of five wild *Solanum* spp. The life cycle is described. Damage may be reduced by spraying nicotine weekly from the time when the fruits first appear; alternate treatments may be combined with bordeaux mixture.

2742. MICHELBACHER, A. E., MIDDLEKAUFF, W. W., AND AKESSON, N. B. 635.64: 632.78
Caterpillars destructive to tomato.
Bull. Calif. agric. Exp. Stat. **707**, 1948, 47 pp., bibl. 27, illus.
This bulletin reports on the value of the new insecticides—DDT, DDD,* and others—as substitutes for calcium arsenate in the control of tomato pests. Nine tomato caterpillars and tomato mite are described and the results of control trials are tabulated. With the exception of not very satisfactory control of the tomato hornworm (*Protoparce sexta*) with a 5% DDT dust at 30 lb. per acre, DDT and DDD were superior to calcium arsenate. There is little difference in effectiveness between DDT and DDD except that 5% DDD dust is highly effective in controlling the tomato hornworm.

2743. SHEN, L. Y. 635.651
A study of natural crossing in *Vicia faba*. [Chinese, English summary ½ p.]
J. agric. Ass. China, 1947, No. 185, pp. 8, 55-61.
The average percentage of natural crossing under field conditions was 24%. Pollen is carried chiefly by bees. Varieties should be planted at least 5 km. apart to avoid crossing. The percentage of natural crossing differs with varieties. [From author's summary.]—Chengtu, Szechwan.

2744. STANGANELLI, M. 632.5: 635.65
Composizione chimica dei semi di *Orobanche speciosa* DC. (=*O. crenata* Forsk.). **(The chemical composition of the seeds of *Orobanche speciosa* DC. (=*O. crenata* Forsk.).)**
Ann. Sper. agrar., 1947, **1** (N.S.): 97-114, bibl. 57.
The results of the analysis of seeds of orobanche (parasitizing horse-beans) show that this seed would be counted among the oil seeds. Some light is thrown on the germination of the seed in the field.—Staz. Sper. Gran. Sicily.

2745. WHITING, A. G., AND MURRAY, M. A. 635.65: 577.17
Abscission and other responses induced by 2,3,5-tri-iodobenzoic acid in bean plants.
Bot. Gaz., 1948, **109**: 447-73, bibl. 15, illus., being *Contr. Hull bot. Lab.* **598.**
Small tumours were formed at stem tips of red kidney beans decapitated in the second internode and treated with 2,3,5-tri-iodobenzoic acid; no root primordia were formed. Treatment of intact young plants at this level led to the abscission of leaves and buds on later growth. The substance appeared to have no independent effect on flowering. The induction of abscission by this compound is discussed in relation to the inhibition of abscission by certain growth substances.

2746. ZAUMEYER, W. J., AND THOMAS, H. R. 635.65: 632.8
Pod mottle, a virus disease of beans.
J. agric. Res., 1948, **77**: 81-96, bibl. 8, illus.
A new virus disease of beans, pod mottle, has been found in S. Carolina. The virus, which is named *Marmor valvolarum*, produces pronounced mottling and malformation of the pods. It is readily transmitted mechanically, young leaves being more susceptible than older ones. Immunological studies showed no relationship between the pod mottle, southern and common bean mosaic viruses.

2747. VAN DER WANT, J. P. H. 635.65: 632.8
Het stippelstreep van de boon (*Phaseolus vulgaris*), een ziekte veroorzaakt door een virus dat in de grond overblijft. **(Bean stipple-streak caused by a soil-borne virus.)**
Tijdschr. PlZiekt., 1948, **54**: 85-90, bibl. 2.
Experimental evidence is presented to show that infection of bean plants with stipple-streak can come from the soil. Heating infested soil at 100° C. for 30 min. destroys the virus. Young plants may become infected with stipple-streak within a week after the seed is sown in infested soil, but the symptoms do not show until several weeks later.

2748. STROMME, E. R., AND HAMNER, C. L. 635.65: 577.17
Delayed maturity of bean plants sprayed with solutions of 2,4-dichlorophenoxyacetic acid of nonherbicidal concentrations.
Science, 1948, **107**: 170-1, bibl. 4, being *J. Art. Mich. agric. Exp. Stat.* **911.**
In a greenhouse study kidney bean plants sprayed with a solution of 2,4-D at 10 p.p.m. one week after germination recovered soon from a temporary inhibition of top growth. At harvest time treated plants carried an average of 11·2 leaves, as against 6·6 per control plant, reflecting the effect of 2,4-D on lateral growth. Fruit set was higher in treated plants, but there was no significant difference in the number of mature pods or the number and weight of seeds. However, treated plants matured their seed almost two weeks later than the controls. In the field, a 10 p.p.m. application of 2,4-D caused only slight epinasty and only a few plants developed abnormal leaves, seed maturity being hardly delayed. A concentration of 100 p.p.m. produced marked formative effects and delayed both flowering and seed maturity.

2749. ENTOMOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE. 635.65: 632.6/7
Insect pests of beans.
Agric. Gaz. N.S.W., 1948, **59**: 257-62, illus.
The principal pests of beans in New South Wales are the bean fly, red spider, green vegetable bug, aphids, thrips, the leaf-hopper or jassid, and the bean-seed weevil. Of less importance, mainly in localized areas, are the green mirid bug, pseudo-loopers, the tomato moth, the bean butterfly and the bean pod borer. They are described and control measures suggested.

2750. BOND, L. 635.656: 577.17
Response of pea roots to application of certain growth-regulating substances.
Bot. Gaz., 1948, **109**: 435-47, bibl. 29, illus.
The responses of cut and entire pea roots to 2,4,5-trichlorophenoxyacetic acid and to tryptophane are described. Little response was shown to asparagine, indoleacetic acid, 2,3,5-tri-iodobenzoic acid or filtrate from a culture of rhizobia. None of the substances used stimulated division of the cortical parenchyma cells, which are involved in the development of nodules.—Wellesley College, Mass.

2751. MATTSON, S., AND KOUTLER-ANDERSSON, E. 635.656: 631.415
The acid-base condition in vegetation, litter and humus. X. Some properties and functions of phytin.
Ann. roy. agric. Coll. Sweden, 1947, **14**: 290-300, bibl. 11.
The experimental plants included pea, the cooking qualities

* =TDE an analogue of DDT, being dichlorodiphenyldichloroethane.

of which were shown in an earlier paper [*H.A.*, 17: 2760g] to be related to the function of phytin.

2752. Lhoste, J., and Ravault, L.
632.951: 632.944: 635.656
Effets sur blé et pois, de quelques insecticides organiques de synthèses, employés comme désinfectants du sol. **(Effects on wheat and peas, of synthetic organic insecticides used as soil disinfectants.)**
Rev. hort. Paris, 1948, **120**: 287-94, bibl. 12, illus.

In dosages equivalent to 200 and 300 kg./ha., 666 and SPC brought about swelling and hypertrophy of the primary root of Serpette pea seedlings; at the higher dosage SPC provoked the development of adventitious roots from the collar. The tops of the plants were unaffected. Chlordane and DDT did not affect peas.

2753. (Ministry of Agriculture, London)
632.78: 635.656
Pea moth.
Adv. Leafl. Minist. Agric. Lond. **334**, 1948, 3 pp., illus.

The pea moth (*Cydia nigricans*), one of the most serious pests of field and garden peas, can be controlled by spraying with a ¼% DDT emulsion at the rate of 120 to 140 gal. per acre. Wettable DDT powders have also given promising results. For crops which are to be picked green a single spraying 7 to 10 days after the beginning of flowering should give satisfactory control. For dry harvesting a second spraying is required about a fortnight after the first.

2754. Wressell, H. B. 635.67: 632.78
Control of the European corn borer in sweet corn.
Processed Publ. Div. Ent. Canad. Dep. Agric. **76**, 1948, 3 pp. +col. pl.

The European corn borer (*Pyrausta nubilalis* Hbn.) is described, and its life history outlined. At least three insecticides are effective in controlling it, viz. Derris (4-5% rotenone) 2 lb., Ryania 2 lb., DDT ½ to ¾ lb. (actual DDT), in 40 gal. water. These insecticides can also be used as dusts. They should be first applied when the eggs begin to hatch in numbers. Four applications at intervals of 5 days will give excellent control.

2755. Humfeld, H. 635.8
The production of mushroom mycelium (*Agaricus campestris*) in submerged culture.
Science, 1948, **107**: 373, bibl. 3.

Good yields of mushroom mycelium were obtained in submerged culture on media containing either asparagus butt juice or press juice from pear waste as the main substrate. The culture method developed and described would lend itself to production on a commercial scale. The mycelium, which has the characteristic mushroom flavour and could be used in the manufacture of mushroom soups, etc., was harvested by centrifuging and dried in the frozen state. It is suggested that the submerged-culture process could be adapted to other organisms for the production of enzymes, antibiotics, etc.—Western Regional Research Laboratory, Albany, California.

Potatoes.

(*See also* 2342, 2392j, 2519, 2842e, i, k, r, t, w, x, 2843b, f, g, h, k, o, r, t, 3091, 3161.)

2756. Hutton, E. M. 633.491(94)
Potato improvement in Australia.
J. Aust. Inst. agric. Sci., 1948, **14**: 71-6, bibl. 18, illus.

The variety characteristics needed for Australia are summarized under: yield, tuber characters, growth type, and resistance to environment, pests and diseases. The general procedure followed in potato breeding is then described.

2757. Ricchello, A., and Goidànich, G.
633.491(437 +492)
La produzione delle patate da seme in Cecoslovacchia e in Olanda nel dopoguerra. **(The production of seed potatoes in Czechoslovakia and Holland in the post-war period.)** [English summary 8 ll.]
Ann. Sper. agrar., 1947, **1** (N.S.): 3 (suppl.): I-XXIX, illus.

The provision made for selection of healthy potato seed true to name in Czechoslovakia and Holland was noted by the authors in visits to those countries.

2758. Treadway, R. H. 633.491-1.57
Utilization of white potatoes.
Amer. Potato J., 1948, **25**: 300-2.

Of the yearly 375 m. bushel crop of potatoes grown in the U.S.A. 86% is used for table or for seed. The rest, 53 million bushels, go into various feed and industrial uses which are here indicated.

2759. Pohjakallio, O., and Salonen, A.
581.14: 612.014.44: 633.491
Der Einfluss der Tageslänge auf Entwicklung und Energiehaushalt einiger Kulturpflanzen. **(The influence of day length on development and energy balance of some cultivated plants.)**
Acta agralia Fenn., 1947, **67**: 5-51, bibl. 47.

The experiments were carried out on the farm of Helsinki University, at a latitude of 60° 10′N, where for about 7 weeks during the summer the length of day (between sunrise and sunset) exceeds 18 hours. Apart from cereals, two potato varieties were considered, one a sensitive long-day plant, Tammisto's Early, the other, Vesijärvi, still earlier but not susceptible to changes in day length. While total yields were not significantly affected, average tuber weight in Tammisto's Early rose from 8·0 to 9·4 g. and the average number of tubers per plant dropped from 15·9 to 12·0 in an artificial 10-hour day. Photoperiodic treatment resulted further in morphological foliage changes, a slight delay in bud initiation and an increase in dry matter content in the underground parts of the plant at the expense of the parts above ground.

2760. Pollard, A., Kieser, M. E., and Crang, A.
633.491-1.8
Factors affecting quality in potatoes. IV.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 233-41, bibl. 4.

The effects of site, variety and manurial treatment on potato quality were again evident in these 1947 tests, the results of which are in agreement with the earlier findings. See *H.A.*, 15: 1706; 16: 2034; and 17: 2275.

2761. Kelly, W. C., and Somers, G. F.
633.491-1.541.11
The influence of certain rootstocks and scions on the ascorbic acid content of potato tubers.
Plant Physiol., 1948, **23**: 338-42, bibl. 3.

The ascorbic acid content of potato tubers was governed by the nature of the underground part of grafted plants, regardless of the genetic constitution of the part above ground.—U.S. Plant, Soil and Nutrition Lab., Ithaca, N.Y.

2762. Chevalier, G. 633.491: 631.541: 635.944
Mimétisme de tubercules de pommes de terre par suite de greffe. **(Mimicry in potato tubers following grafting.)**
Bull. Soc. bot. Fr., 1948, **95**: 34-6.

An attempt, on a small scale, to modify the texture of tubers of potato and dahlia by the exchange of mobile nutritive substances after intergrafting, is described. Potato shoots (of a round rough-skinned variety) were grafted on to dahlia tubers. After being left in the open air for 2 days the tubers were planted. The tubers of the resultant potato

crop were variable, but some of them were elongated and had smooth skins, while others, furrowed and scaly, were borne in clusters, and in these characters the author sees resemblance to dahlia tubers. In the reciprocal grafting of dahlia on potato only one plant was obtained, a typical vigorous dahlia.

2763. HALLGREN, G. 633.491: 551.571
Studies on the influence of precipitation on crop yields in Sweden with special reference to field irrigation.
Ann. roy. agric. Coll. Sweden, 1947, **14**: 173-289, bibl. pp. 9½.
The bulk of this paper is devoted to agricultural crops. In respect of potatoes the data indicate that Swedish growers have few meteorological worries, for the mean rainfall very nearly approximates to the calculated optimum.

2764. JUNGE, K. 633.491 +635.35
Die Kultur Frühkartoffeln—Blumenkohl in der Glückstädter Marsch. **(Early potatoes and cauliflower grown in succession in the Glückstadt Marsch, Germany.)**
Ceres, Hamburg, 1948, No. 2/4, pp. 1-2.
A grower describes how he has grown early potatoes followed by cauliflowers on the same land, at Glückstadt, near Hamburg, for 25 years without any detrimental effect showing. The fields receive an application of 1,250 quintals of stable manure per hectare. The cauliflowers are planted out from the frames without previous transplanting or potting.

2765. WILSON, A. R., AND MCKEE, R. K. 664.84.21; 577.17
Prevention of excessive sprouting in late-stored ware potatoes.
Agriculture, Lond., 1948, **55**: 296-9, bibl. 4, illus.
After quoting figures showing the wastage due to sprouting in clamps of main crop potatoes, an account is given of 1947 tests at Peterborough using MANA (methyl-alpha-naphthalene acetate) applied, in gypsum, at the time of clamping at the rate of 1·6 oz. (cost 16s.) per ton of potatoes. The effect of the treatment was to reduce the weight of sprouts produced by 11 May from 1·8% (control) to 0·9%. Cooking tests showed no deleterious effects of treatment on quality. It is doubtful whether any financial saving was effected by the treatment in this particular experiment. Further experiments are necessary, using several potato varieties in scattered localities, before it will be possible to say whether, and under what conditions, MANA may be expected to prove of value.—Agric. Res. Coun., England.

2766. LUCKWILL, L. C. 664.84.21: 577.17
A further experiment on the use of growth-substances to inhibit the sprouting of stored potatoes.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 137-42, bibl. 2, illus.
An experiment is described in which potatoes stored in wooden boxes were treated in November with three different growth substances applied at 1% in talc at two different rates of application. Measurements of sprout weight made between April and June showed that methyl-alpha-naphthalene acetate (MANA) and methyl-alpha-naphthalene methyl ether (MNME) applied at the rate of 100 g. per ton were both very effective in suppressing sprouting, but that methyl ester of 2,4-dichlorophenoxyacetic acid (M2: 4D) had no significant effect. At 20 g. per ton only MANA had any appreciable effect on the weight of sprouts produced. Potatoes treated with talc only (controls), decreased in weight by 24% between November and July, whereas those treated with MANA and MNME at 100 g./ton lost less than 10%. Pressure tests confirmed that the untreated potatoes were much softer than the treated. In potatoes treated with MANA the lateral buds of the "eye" were more strongly suppressed than the terminal bud, but when MNME was used the reverse was the case. It is concluded that, should MNME prove as effective under clamp conditions as it has done in laboratory trials, its relative cheapness might make the autumn treatment of potatoes in Britain an economic possibility. [From author's summary.]

2767. CLARIDGE, J. H. 664.84.21: 577.17
Plant hormone inhibits sprouting of stored potatoes.
N.Z. J. Agric., 1948, **76**: 494.
Trials are described to test the effect of methyl ester of alpha-naphthaleneacetic acid on the sprouting of potatoes. Applications after sprouting had started were unsatisfactory, but before sprouting their effect was pronounced. In a typical case, four months after treatment, the treated tubers were all sprouted but the sprouts were only 1 in. long and the tubers were only slightly soft, whereas the untreated tubers were soft and had sprouts up to 6 in. long.

2768. BOOCK, O. J. 633.491
Corte de tubérculos de batatinha (*Solanum tuberosum* L.). Parte I—Estudos comparativos sôbre plantio de tubérculos inteiros, e cortados em "apice" e "base". **(Cutting seed potatoes, Part I, Comparison of uncut seed with apical and basal pieces.)** [English summary 14 ll.] Parte II—Estudos comparativos sôbre o plantio de tubérculos inteiros e cortados no sentido "longitudinal". **(Part II, Comparison of uncut seed with seed cut longitudinally.)** [English summary 11 ll.]
Bragantia, 1947, **7**: 1-14, bibl. 18, illus., and **7**: 197-206, bibl. 5, illus.
At four stations in the State of São Paulo whole tubers generally gave better establishment and yields than cut sets. At Joanópolis, 1,000 m. above sea level, cut seed gave good results. At Tabauté (500 m.), longitudinally cut sets gave fair results with irrigation, but were liable to rot under these conditions.

2769. PLANT, W., HEWITT, E. J., AND NICHOLAS, D. J. D. 633.491-1.8
Some effects of lime and fertilisers on potatoes on a strongly acid soil as determined by visual symptoms and chemical tests. II.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 97-103, bibl. 4.
The effects of liming and of various fertilizer treatments, with and without lime, were examined in 1947 on six potato varieties, Majestic, Dunbar Rover, Gladstone, Kerr's Pink, King Edward and Arran Banner, in relation to the incidence of mineral deficiencies and excesses. The site was situated in the Midlands [of England], and the soil was strongly acid, having been reclaimed in 1945 from heath. In general, the results of the 1946 experiment were corroborated. It is suggested that Dunbar Rover is the most suitable variety to grow under these conditions after the application of appropriate liming and fertilizers. [From authors' summary.] (See *H.A.*, 17: 2273.)

2770. NYLUND, R. E. 633.491-2.19
A preliminary study on the use of rapid chemical tests as aids in diagnosing nutrient deficiencies in the Irish potato.
Amer. Potato J., 1948, **25**: 216-24, bibl. 22, being *Pap. sci. J. Ser. Minn. agric. Exp. Stat.* **2368.**
The potatoes were grown on a loamy sand soil deficient in nitrogen. Applications of nitrogen at the rate of 80 or 160 lb. per acre doubled both tuber yield and the N content of leaf petioles. Other results obtained were: The concentrations of soluble P and K_2O were found to be inversely correlated with the soluble N content of potato leaf petioles. Soil applications of phosphate or of potash

fertilizer had no effect on yields of tubers, or on soluble N content of potato leaf petioles. Under the conditions of this experiment, the maximum yields were obtained when the soluble N content of the leaf petioles at the time of first visible flower buds were 600-700 p.p.m.; the soluble P content was 300-400 p.p.m.; and the soluble K_2O was 4,200-6,200 p.p.m.

2771. Bolas, B. D., and Portsmouth, G. B. 633.491-2.19: 546.711
Physiological effects of manganese.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 126-8.
In experiments on manganese-deficient potato plants no increase in apparent photosynthesis resulted from injecting leaf-stalks with a dilute solution of manganese sulphate, but there was a significant increase in dry weight per unit area. Manganese levels in the experimental leaflets were effectively raised by injection.

2772. Zimmermann-Griess, S. 633.491-2.19
Internal rust spot of potatoes.
Palestine J. Bot. (*R*), 1947, **6**: 174-80, bibl. 5, illus.
A survey of the occurrence of internal rust spot in Palestine has established (*a*) that the condition obtains both on light and heavy soils; (*b*) that the disease is absent in crops lifted in winter, rare in those lifted in early spring, but increasingly serious in later spring crops, especially when lifted late in summer (July); (*c*) that potato varieties differ very markedly in their susceptibility. Of 24 varieties covered by the survey, Invincible and Champion were most susceptible, followed by Arran Banner, Kerr's Pink, and Red Skin. Up-to-Date, Majestic, Epicure and some other varieties were affected only slightly and when lifted very late, while many varieties were not affected even then. In the varieties Arran Banner and Invincible small tubers were less affected than larger ones. Internal rust spot is not transmissible through affected seed tubers. [From author's summary.]

2773. van der Plank, J. E. 632.8: 633.491
Origin of some plant viruses.
Nature, 1948, **162**: 291-2, bibl. 4.
Evidence is advanced for the belief that potato paracrinkle virus is not unique in its origin, and that other plant viruses may also have arisen in germinating seed.

2774. Doncaster, J. P., and Gregory, P. H. 633.491: 632.8
The spread of virus diseases in the potato crop.
A.R.C. report series **7**, H.M. Stationery Office, London, 1948, 189 pp., bibl. 53, 5s. net.
In the Introduction (by F. C. Bawden) it is stated that, of the twenty or so potato viruses that have been described, only three need mentioning in this country, namely potato virus X and Y and leaf-roll virus. The others either do not occur in Britain or occur rarely and are relatively unimportant. The rapid degeneration of potatoes in English lowlands is known to be due to the spread of rugose mosaic (virus Y) and leaf roll. This report is a study of these two diseases made by periodical sampling of 63 crops of Majestic, and in it the following subjects are discussed: (1) The development of the potato plant, (2) overwintering of potato aphides, (3) the summer aphis infestations, (4) trapping of winged aphides, (5) the increase of rugose mosaic and leaf roll, (6) the distance of spread of rugose mosaic and leaf roll, (7) experiments on the effect of roguing, (8) fumigation of potato crops, (9) the survival of volunteer potatoes in arable fields. The general conclusion drawn from the data (tabulated) is that reasonably good "seed" could probably be produced in the English lowlands during an emergency by drastic roguing and early lifting, but normally this would be uneconomic. "The most practical method of increasing the life of seed stocks would seem to be to improve still further the health of stocks raised in seed growing districts, to grow them in relative isolation and, most important of all, to plant them on land free from volunteers."

2775. Cunningham, H. S. 633.491-2.8
Leaf roll in relation to second-crop seed potato production on Long Island.
Bull. Cornell agric. Exp. Stat. **731**, 1948, pp. 13, bibl. 4.
The experiments show that second-crop seed potatoes produced on Long Island are not inferior to northern-grown seed, if (1) disease-free stock is used for planting, (2) clean land is chosen where no infected volunteer plants occur and (3) aphid control is carried out thoroughly. Unless the percentage of infected plants is relatively high, the presence of leaf roll will not significantly reduce yields.

2776. Kirkpatrick, H. C. 633.491-2.8
Indicator plants for studies with the leafroll virus of potatoes.
Amer. Potato J., 1948, **25**: 283-90, bibl. 3.
Physalis floridana, *P. angulata*, and *Datura stramonium*, especially the first, are excellent indicator plants for potato leaf roll, showing distinct symptoms within 15 to 30 days from inoculation.

2777. Wilson, J. H. 633.491-2.8
The use of the phloroglucinol test for diagnosis of leaf roll in potatoes.
J. Aust. Inst. agric. Sci., 1948, **14**: 76-8, bibl. 1.
The method used is a modification of one described by Sheffield, using concentrated, instead of 50%, HCl. The test is now being used for the routine testing of plants retained for use as foundation stock in the Tasmanian seed potato certification scheme. The availability of a means of deciding in doubtful cases between true leaf roll and leaf roll appearance due to other causes, as well as indicating the extent of masking in certified seed crops, is proving of considerable value in roguing and inspecting.—Dep. Agric., Launceston, Tasmania.

2778. Hovey, C., and Bonde, R. 633.491-2.8
***Physalis angulata*, a test plant for the potato leafroll virus.**
Phytopathology, 1948, **38**: 505-7, illus.
The use of *Physalis angulata* as a test plant has materially shortened the time necessary for making inoculation experiments with the leaf-roll virus and facilitated the study of certain phases of the aphid-leaf-roll relationship.—Maine agricultural Experiment Station.

2779. Bawden, F. C., Kassanis, B., and Roberts, F. M. 633.491-2.8
Studies on the importance and control of potato virus *X*.
Ann. appl. Biol., 1948, **35**: 250-65, illus.
Methods are described of testing for the presence of avirulent strains in potatoes, by transmission to suitable indicator plants, plant-protection tests, and serological methods. Infection of virus-free stocks of the varieties Majestic and Arran Banner with four different strains of virus *X* reduced their yields by amounts varying from 5 to 24%. In Britain, at the present rates of production there are annually about 700,000 acres of potatoes infected with virus *X*, which must be reducing yield by more than 500,000 tons. In other countries the position is even worse, for all the widely grown varieties are 100% infected. The virus was not transmitted by cutting healthy tubers with a knife previously used to cut infected ones. Infection occurred when sprouts were rubbed with infective sap, and the virus also spread from infected to healthy sprouted tubers stored in the same sack. The relative importance of volunteer plants and other sources of infection is discussed, and methods of testing the virus-free stocks are suggested.—Rothamsted Experimental Station.

2780. ROBERTS, F. M. 633.491-2.8
Experiments on the spread of potato virus *X* between plants in contact.
Ann. appl. Biol., 1948, **35**: 266-78, bibl. 9.
In experiments on the spread of 5 strains of potato virus *X*, with 7 potato varieties and with tomato plants under glass and in the field, the spread by leaf contact between healthy and infected plants was confirmed, and spread occurred between plants whose only contact was below ground. Tomato plants became infected when growing in soil containing sap or residues from *X*-infected plants. No infection was found except when healthy plants came into direct contact with sources of the virus.—Rothamsted Experimental Station.

2781. CLINCH, P. E. M., AND MCKAY, R. 633.491-2.8
Effect of mild strains of virus *X* on the yield of Up-to-Date potato.
Sci. Proc. Roy. Dublin Soc., 1947, **24**: 189-98, bibl. 11.
A description is given of a field trial conducted to determine the effect of two different mild strains of virus *X* on the cropping capacity of Up-to-Date potato, a symptomless carrier. Two Up-to-Date clones were tested, and from single tubers of these all experimental plants were derived. The results in general indicated that no significant reduction in yield was caused by the latent strains of *X* employed, the tendency being rather towards an increase in yield due to the infection. The yields from a small propagation plot of the same Up-to-Date stocks in the previous season showed a similar trend. The results are discussed and compared with those of other investigators.—Univ. Coll., Dublin.

2782. PERRAULT, C. 633.491-2.3
Études sur la pourriture du cerne des pommes de terre causée par *Corynebacterium sepedonicum* (Spieck. & Kott). Skaptason & Burkholder. 1. Les agents de dessémination. **(Studies of potato ring rot caused by *Corynebacterium sepedonicum* 1. Means of transmission.)** [English summary 14 ll.]
Sci. Agric., 1948, **28**: 244-60, bibl. 26, being *Contr. Div. Bot. Plant Path. Sci. Serv., Dep. Agric. Canada* **934.**
Since 1937, experimental results obtained in the Province of Quebec have shown that potato ring rot is disseminated mainly by infected tubers, knives, planting and digging machines and various containers. No definite evidence was obtained as to the propagation of the disease in the field through cultural methods. Volunteer plants may become a source of infection when the same field is planted to potatoes for two consecutive years. A higher rate of infection resulted when small tubers were planted as compared with large tubers, but much less infection was obtained from planting small and whole tubers than from larger and cut tubers. Bacteria-like bodies resembling *Corynebacterium sepedonicum* were observed in a few types of insects commonly feeding upon potato plants affected with ring rot, but no evidence was obtained as to the transmissibility of the disease through such insects. Under climatic conditions of this Province ring rot is not transmitted through the soil. [Author's summary.]

2783. LITTAUER, F., VOLCANI, Z., AND TEMKIN-GORODISKY, N. 633.491-2.3
Brown rot of potatoes in Palestine.
Palestine J. Bot. (*R*), 1947, **6**: 219-20, illus.
A note on this disease, observed in Palestine for the first time in 1946. The identity of the causative organism, *Pseudomonas solanacearum*, is confirmed.

2784. PRATT, A. J. 633.491-2.411
Yield and grades of blight resistant potatoes grown in twenty different locations in New York State in 1947.
Amer. Potato J., 1948, **25**: 209-15, being *Pap. Dep. Veg. Crops Cornell Univ.* **300.**
Seventeen blight-resistant potato varieties were tested against 3 standard varieties, viz. Green Mountain, Katahdin and Rural. All plantings were made during the latter half of the potato planting season in each area. Although it had been originally planned to spray with DDT only, copper had to be used to a small extent. In 9 locations where blight was not serious, yields in bushels per acre of No. 1-grade tubers were 286 and 269 respectively for susceptible and resistant varieties, and in 12 locations where blight was serious, 87 and 222 respectively. The planting of resistant varieties would therefore be preferable under conditions where blight control is not likely to be good.

2785. BEAUMONT, A. 633.491-2.411
The dependence on the weather of the dates of outbreak of potato blight epidemics.
Trans. Brit. mycol. Soc., 1947, **31**: 45-53, bibl. 15.
Eleven years' observations at Seale-Hayne College, Devon, suggest that the temperature humidity rule is probably slightly more useful for blight forecasting in S.W. England than the Dutch rules.

2786. PALTI, J. 632.952: 633.491
Further work on the application of fungicidal sprays by overhead irrigation equipment.
Palestine J. Bot. (*R*), 1947, **6**: 201-4, bibl. 2.
Phytophthora blight of potatoes was effectively checked by applying ¼% Perenox spray through overhead irrigation equipment. Some experiences in the use of this method and its advantages are briefly discussed.

2787. MUNCIE, J. H., AND MOROFSKY, W. F. 633.491-2.952
Nitroacetate and nitrodithioacetates as potato sprays.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 445-7.
The nitrodithioacetates of copper and zinc and copper nitroacetate, in combination with DDT and benzene hexachloride, reduced early blight infection of potatoes to 1%, as compared with 5% in the bordeaux + insecticide-plots and with 15% in untreated controls. No depression of yield resulted from the application of the new fungicides. The hexa product was inferior to DDT as an insecticide and it had an unfavourable effect on yields.

2788. EMILSSON, B., AND GUSTAFSSON, N. 633.491-2.411
Undersökningar beträffande bekämpning av bladmögel och brunröta hos potatis. III. Preliminära försök med blastdödande medel. **(Studies on the control of late blight in potatoes. III. Preliminary trials with haulm killing chemicals.)** [English summary ¾ p.]
J. roy. Swed. Acad. Agric., 1948, **87**: 199-215, bibl. 16.
Of the chemicals tested for potato haulm killing sulphuric acid, TAC 2 and Dowspray 66 Improved have given the best results, far superior to those obtained with sodium chlorate or with a mixture of copper sulphate and sodium chloride. The use of sulphuric acid is restricted by its corrosive properties and that of TAC 2, which is otherwise ideal, by its high cost. Thus Dowspray 66 Improved, a dinitro compound, is recommended at present, though its action is somewhat slower and less complete than that of the two other compounds. An addition of 2% aluminium sulphate was found to improve performance. At the end of the growing season the susceptibility of the vines increases and good kills are achieved with less active preparations.

Varietal differences in susceptibility do not seem to enter into the problem. Haulm killing had very little influence on tuber size, but it favoured skin formation, especially when the haulms were still green and vigorous at the time of killing. In view of the dry summer in 1947 no data were obtained on the relationship between vine destruction and blight incidence.—Inst. for Plant Research and Cool Storage, Nynäshamn.

2789. CALLBECK, L. C. 633.491-2.95
Current results with potato vine killers in Prince Edward Island.
Amer. Potato J., 1948, **25**: 225-33, bibl. 6, being *Contr. Sci. Serv. Dep. Agric. Canada* **937.**
The data indicate that sodium arsenite herbicides, which have a slow action if applied by themselves, are just as effective potato vine killers as Dowspray 66 Improved or Sinox General, if applied with the addition of oil. While tubers from control plots did not show any discoloration, browning was common in samples from treated plots, the degree of discoloration under the point of stolon attachment being correlated with the rapidity of the kill. Chemicals that caused the vines to die most quickly induced the most pronounced effects. The amount and intensity of discoloration in tubers killed at intervals with dinitro ortho secondary butyl phenol are tabulated. The figures show a marked increase in injury with the age of the plants. Vine killing by chemicals did not affect culinary potato quality.

2790. HEY, A. 633. 491-2.4
Die Biotypenforschung beim Erreger des Kartoffelkrebses, *Synchytrium endobioticum* (Schilb.) Perc., in Deutschland. **(Research into biotypes of *Synchytrium endobioticum*, the pathogen of potato wart disease, in Germany.)**
NachrBl. dtsch. PflSchDienst, 1948, **2**: 1-3.
In 1942 a very virulent biotype of potato wart disease, which attacked practically all resistant varieties, appeared in the German village of Giessübel. The variety Fram proved highly resistant to the new fungus strain, but it is not popular with farmers. Since the first outbreak a number of potato strains, produced in the breeding programme for wart resistance, have been tested against this and another particularly virulent biotype. The article is a progress report of the testing work carried out in the laboratory and in infested fields.

2791. MAI, W. F., AND LOWNSBERY, B. F., Jr. 633.491-2.651.3
Studies on the host range of the golden nematode of potatoes, *Heterodera rostochiensis*, Wollenweber.
Amer. Potato J., 1948, **25**: 290-4, bibl. 5.
All American varieties of cultivated potatoes (16) and tomatoes (6) tested proved susceptible to the golden nematode, the potatoes being the more strongly attacked.

2792. PARRIS, G. K. 633.491-2.651.3
Influence of soil moisture on the growth of the potato plant and its infection by the root-rot nematode.
Phytopathology, 1948, **38**: 480-8, bibl. 4.
The higher the soil moisture, the higher the tuber yields in fumigated soil as well as in soil infested with nematodes (*Heterodera marioni*), but also the greater the nematode injury to the tubers in infested soil. In a dry, infested soil yields were too low to be economic, from which it follows that, if the root-knot nematode is present, soil moisture should be adequate. There was evidence that the nematode can enter potato tubers through enlarged lenticels which are common on tubers in wet soils.—Florida agricultural Experiment Station.

2793. WILKINS, V. E. 633.491-2.76
International scheme for the control of Colorado beetle.
Agriculture, Lond., 1948, **55**: 307-10, illus.
Explains what the International Control Scheme is designed to achieve and gives some indication of the progress made in the first year of its operation.

2794. MAYNÉ, R., AND BRENY, R. 633.491-2.76
Rapport et considérations sur l'activité doryphorique en 1947 et en Belgique. **(Notes on Colorado beetle activity in Belgium in 1947.)**
Parasitica, 1948, **4**: 85-97, bibl. 10.
The author discusses in detail the climatic factors underlying the unusually heavy infestation of Colorado beetle in 1947, with particular reference to the Gembloux region of Belgium. The conditions in spring were favourable for the emergence of adults from hibernation, pairing, egg-laying, and hatching of larvae. Conditions continued to favour the beetle and allowed the development of a complete second generation before the advent of the autumn frosts. He advises a more detailed study of invasions and infestations as bases for the prognostication of future potential losses by the beetles.

2795. DE WILDE, J. 633.491-2.76
Over de oorzaken der " resistentie " van *Solanum demissum* L. tegen de aantasting door de Coloradokever (*Leptinotarsa decemlineata* Say.). **(The cause of resistance of *Solanum demissum* to Colorado beetle attacks.)** [French summary ½ p.]
Tijdschr. PlZiekt., 1948, **54**: 90-4, bibl. 3.
The author concludes that strains of *Solanum demissum* resistant to Colorado beetle attack owe their resistance not to any toxicity (as supposed by Trouvelot and Busnel, *C.R. Acad. Sci.*, 1937, 205: 1171-3) but to their unsuitability as food, so that when the larvae are fed on them under confined experimental conditions they starve.

2796. BARBE, J. 633.491-2.76
Nouveaux procédés biologiques de lutte contre le doryphore. **(New methods of biological control of the Colorado beetle.)**
Rev. hort. Paris, 1948, **120**: 252.
In an attempt to secure a hybrid between *Solanum demissum* and *S. tuberosum* with leaves sufficiently rich in solanine to be toxic to the Colorado beetle, field and laboratory tests are being made at the Chesnoy School of Agriculture by the Polish Ministry of Agriculture with the support of the Versailles Station des Recherches Agronomiques. Work on three parasites continues.

2797. DE WILDE, J., AND VAN DER LAAN, P. A. 633.491-2.76
Oriënterende proeven met derris en andere bestrijdingsmiddelen tegen de coloradokever (*Leptinotarsa decemlineata* Say.). **(Preliminary tests of derris and other insecticides against the Colorado beetle.)**
Landbouwk. Tijdschr., 1948, **60**: 284-90, bibl. 3.
In a field test satisfactory control of adult Colorado beetles and larvae was obtained using sprays and dusts of derris, DDT and 666, these insecticides proving at least as effective as calcium arsenate. Derris remained toxic for a shorter time than did the other insecticides, which remained effective for 4 days when applied as dust and for 8 days when sprayed. The first summer generation of beetles, against which the rotenone content must be at least 1%, were more resistant to derris than overwintered beetles. [From authors' conclusions.]

2798. DAVIS, E. W., AND LANDIS, B. J. 633.491-2.76
Overwintering of potato flea beetles in the Yakima Valley.
J. econ. Ent., 1947, **40**: 821-4, bibl. 6.

Litter is essential for the overwintering of the western potato flea beetle, *Epitrix subcrinata*, and soil for the tuber flea beetle, *E. tuberis*. Winter ploughing failed to reduce survival of these flea beetles.

2799. Broekhuysen, G. J., and Macnae, W. 633.491-2.78
The potato caterpillar pest (*Agrotis* spec.) of Tristan da Cunha.
Nature, 1948, **162**: 225-6.

On the island of Tristan da Cunha the caterpillars of an unidentified *Agrotis* sp. have ravaged the potato crop for some time by completely defoliating the haulms. During a short stay the South African authors found in several field tests that wettable DDT sprays gave excellent control of the pest and that sodium silicofluoride was fairly effective. It is further suggested that the numbers of the local thrush species should be augmented to control the caterpillar in the surrounding vegetation. The pest is said to have developed on the island since the old custom of using kelp as manure was abandoned in favour of sheep manure.

2800. Attia, R., and Mattar, B. 633.491: 632.78
Some notes on "the potato tuber moth" (*Phthorimaea operculella* Zell.).
Bull. Minist. Agric. Egypt, tech. sci. Serv. Ent. Sect. **216**, 1939, 136 pp., bibl. 213, illus. [received 1948].

The insect and its life-cycle are described. Biological control (with a list of parasites) and measures to be taken in the field and in store are discussed.

Tobacco.

(*See also* 2842a, b, f, g, v, 28431, n, 3138.)

2801. Horowitz, B., Croll, R. D., and Bell, T. C. 633.71
***Nicotiana rustica* as an Australian field crop.**
J. Aust. Inst. agric. Sci., 1948, **14**: 61-70, illus.

An account of the cultivation of *Nicotiana rustica* under contract in various parts of Australia during two seasons. Inevitably, the cost of the raw material is high compared with waste smoking tobacco; but by breeding and improved cultivation it should be possible to produce nicotine sulphate competitively, particularly as little smoking tobacco is now treated as waste.

2802. S., A. 633.71(45)
La tabacchicoltura italiana. **(Italian tobacco culture.)**
Il Tabacco, 1948, **52**: 89-93.

An account of tobacco growing in Italy with graphs of the areas under tobacco and yields from 1905 to 1947, and a table of yields in each of the tobacco-growing regions in 1937 and 1946.

2803. Yu, Te-Tsun, and Tsu, Chia-Tsai. 633.71(51)
The studies of tobaccos cultivated in Yunnan [S. China]. [Chinese, English summary 3 pp.]
J. agric. Ass. China, 1947, No. 185, pp. 5-8, 33-54, illus.

A report on numerous experiments into: seed treatment, mulching of seedbeds, time of sowing, transplanting, manuring, spacing, topping, control of diseases and pests. Fifteen tobacco varieties are named, their main characteristics given and some yield figures quoted. [From authors' summary.]

2804. Aksu, S. 633.71: 581.192
Tutun organik asidleri üzerinde çalismalar 1. **(The organic acids of tobacco.)** [French summary 2 pp.]
Tekel Enstitüleri Raporlari, 1947, **5**: 30-42, bibl. 11.

In a study of organic acids (citric, oxalic, malic) of Turkish tobaccos, methods of analysis are discussed and new ones described. Results of analyses of samples from various sources in 1944 are tabulated.

2805. Arsan, E. N. 633.71: 581.4
Kuru yaprak tütünlerimizin anatomik yapisi hakkinda incelemer: II. **(The anatomy of Turkish dry leaf tobaccos. II.)** [English summary ½ p.]
Tekel Enstitüleri Raporlari, 1947, **5**: 43-9, illus.

The anatomy of Basma tobacco leaves varies, under the influence of external conditions, according to the position of the leaf, the time of plucking, etc. It also varies in different parts of the same leaf.

2806. Szteyn, K., and van der Ven, R. 633.71-1.531
Een zaaimal voor tabakszaad en andere fijne tuinbouwzaden. **(A sowing frame for tobacco and other fine horticultural seed.)** [English summary 12 ll.]
Meded. Direct. Tuinb., 1948, **11**: 435-8.

The tobacco Experimental Station at Wageningen has designed a new sowing frame for use with small seeds. It is of galvanized sheet-iron or aluminium, 0·8×1·5 m., the size of a Dutch light. In the frame are triangular bars of sheet-iron (base 4 cm.) fixed to leave slits of 3 mm. between them. Seed, mixed with sand, and scattered over the frame falls through the slits in rows. It is claimed that by this method a saving of 25-40% of seed is effected as compared with broadcasting. 0·25-0·40 g. of seed are required for each Dutch light. A special small hoe (25 mm. wide) is used for weeding and thinning, the final distance between the plants being 4×4 cm.

2807. Street, O. E., and Jensen, C. O. 633.71-1.4
A soil management program for Penn tobacco farmers.
Better Crops with Plant Food, 1948, **32**: 7: 21-4, 41-3.

The high levels of nutrients and organic matter essential for the satisfactory production of cigar filler tobacco in Pennsylvania can be maintained by a rotation of tobacco, winter wheat, hay and corn; one sod crop should be included. All crops should be fertilized, and manures should be distributed throughout the rotation.

2808. Bortner, C. E., Weeks, M. E., and Karraker, P. E. 633.71: 631.8: 632.19
Injury to tobacco seedlings from excessive fertilizer applications.
Bull. Ky agric. Exp. Stat. **513**, 1948, pp. 15, bibl. 3.

Injury to tobacco seedlings is only likely to arise from excessive applications of fertilizer followed by drought. Such damage may be avoided by applying not more than 1,450 lb./ac. of a 6-8-6 fertilizer, and watering weekly (½ gal./sq. ft.) in dry weather.

2809. Matsumoto, T. 633.71-2.3/4+2.8
Tobacco diseases in Formosa.
Mem. Fac. Agric. Taiwan Univ., 1946, **1**: 1: 1-17, bibl. 23, illus.

Thirty-eight diseases of tobacco in Formosa are described, classified as virus (11), bacterial (3), fungous (14), caused by animals (2), non-parasitic (8). Pythium damping-off and granville wilt (*Bacterium solanacearum*) are important in seedbeds, sometimes destroying almost all the seedlings in the beds. Granville wilt is also destructive in the field. Mosaic diseases also are economically important, necrotic mosaic in particular being very destructive.

2810. Jones, L. H. 633.71-2.19: 546.72
Soil temperature as a factor in the frenching of tobacco (*Nicotiana tabacum* L.).
Plant Physiol., 1948, **23**: 560-75, bibl. 19, illus., being *Contr. Mass. agric. Exp. Stat.* **655.**
Jones, L. H., and Tio, M. A.
Unavailability of iron as a cause of frenching of tobacco (*Nicotiana tabacum* L.).
Plant Physiol., 1948, **23**: 576-94, bibl. 11, illus., being *Contr. Mass. agric. Exp. Stat.* **656.**

Frenching of tobacco is apparently due to a deficiency of iron, which may be induced at high soil temperatures by microbiological activity, even in soil from which the plant can obtain sufficient iron at lower temperatures.

2811. KASSANIS, B., AND SELMAN, I. W. 632.8: 633.71
Variations in the reaction of white burley tobacco to the Tomato Aucuba Mosaic virus and to some other strains of tobacco mosaic virus.
J. Pomol., 1947, **23**: 167-70, bibl. 2, illus.

As a result of tests made with Tomato Aucuba Mosaic virus and two other strains of tobacco mosaic virus it was found that the tobacco variety White Burley exists in two distinct lines, which show only slight morphological differences in the leaf laminae. Plants from one of these lines develop necrotic local lesions when inoculated with Tomato Aucuba Mosaic virus and, occasionally, severe systemic necrosis. Plants from the other line develop a yellow mottle with the same inoculum. In the lines of White Burley tobacco in which Tomato Aucuba Mosaic virus induces necrosis, some other strains of tobacco mosaic virus also react necrotically. The possible consequences of these results in virus work are discussed. [Authors' summary.]

2812. FULTON, R. W. 633.71-2.8
Hosts of the tobacco streak virus.
Phytopathology, 1948, **38**: 421-8, bibl. 9.

Burdock (*Arctium minus*), hedge mustard (*Sisymbrium officinale*), white clover (*Trifolium repens*), bindweed (*Convolvulus arvensis*) and plantain (*Plantago major*) were found naturally infected with the tobacco streak virus in the vicinity of diseased tobacco fields. In experiments the virus proved to have a wide host range, 87 out of 169 species inoculated being susceptible.—Wisconsin agricultural Experiment Station.

2813. TAKAHASHI, W. N. 633.71-2.8
The inhibition of virus increase by malachite green.
Science, 1948, **107**: 226, bibl. 5.

Tobacco mosaic virus in detached *Nicotiana glutinosa* leaves was studied.

2814. TROTTER, A. 633.71-2.3
Sulla presenza di tumori radicali nelle coltivazioni di tabacco di pieno campo. **(Crown gall of tobacco in the field.)**
Il Tabacco, 1948, **52**: 99-111, bibl. 21, illus.

A severe outbreak of crown gall on Kentucky tobacco at Padule (Salerno) and another at Magliano Sabino (Rieti) are described. Large galls, 5-7 cm. in diameter, were present on affected plants where the main root branched, and smaller ones on the secondary roots. Although the causative organism was not isolated, the author gives reasons for assuming that the galls were caused by *Bacterium tumefaciens*. Control measures are discussed.

2815. COSTA, A. S. 633.71-2.4
Mancha aureolada e requeima das fôlhas do fumo causadas por *Corticium solani*. **(Golden spot and scorch of tobacco leaves caused by *Corticium solani*.)**
O Biológico, 1948, **14**: 113-4, bibl. 8, illus.

This form of disease occurred only in plants grown under cover for virus studies, and not in the field.—Instituto Agronômico, Campinas.

2816. TIRELLI, M., AND DONADONI, E. 633.71-2.951
Prime prove sull'impiego del DDT contro insetti nocivi ai semenzai di tabacco. **(Testing DDT for the control of pests in tobacco nurseries.)**
Il Tabacco, 1948, **52**: 50-2, bibl. 9.

Gesarol dusted on the soil at the rate of 5 g. a square metre was found to control the field ant, *Tetramorium caespitum* var. *meridionale*, and a springtail (*Collembola*) not identified. —Ist. scient. sper. tabacchi, Rome.

2817. CREIGHTON, J. T., AND GRESHAM, W. B., Jr. 633.71-2.753
Parathion for control of green peach aphid on shade-grown tobacco.
J. econ. Ent., 1947, **40**: 915-7.

Dusts containing 0·5 or 1% parathion, applied to the upper surfaces of tobacco leaves, killed the green peach aphids underneath.—University of Florida, Gainesville.

2818. TENHET, J. N. 633.71-2.76
Effect of sublethal dosages of pyrethrum on oviposition of the cigarette beetle [*Lasioderma serricorne*].
J. econ. Ent., 1947, **40**: 910-1.

Control of the cigarette beetle in tobacco warehouses was consistently better than mortality data indicated, because surviving females laid fewer eggs.—Bureau of Entomology and Plant Quarantine.

2819. WILD, H. 633.71-2.5
A suggestion for the control of tobacco witchweed (*Striga gesnerioides*) by leguminous trap-crops.
Rhod. agric. J., 1948, **45**: 208-15, bibl. 4, illus.

The history of the occurrence of *Striga gesnerioides* (Willd.) Vatke as a parasite on tobacco in Southern Rhodesia is given. The parasite and its mode of life are described. Its known indigenous hosts are given. Field trials showed that the tomato may also be attacked. The cow-pea, dhal (pigeon-pea) and velvet bean can induce the germination of the parasite, and these three crops are consequently recommended as possible trap-crops. [Author's summary.]

Fibres.

(*See also* 2991-2995.)

2820. LITTLE, E. L. 633.526.2
Growth and reproduction in *Agave palmeri*.
Abstr. in *Bull. ecol. Soc. Amer.*, 1948, **29**: 40.

Agave palmeri, the largest native species of century-plants, is a possible source of alcohol and fibre, though the number of wild plants probably is not sufficient for extensive commercial development. It is suggested that deserts and other uncultivated lands could be made more productive by growing improved forms of native plants such as this.

2821. MEDINA, J. C., AGUIRRE, J. M., Jr., AND CORREIA, F. A. 633.526.41
Estudo agrícola-tecnológico de diversas variedades de *Phormium tenax* Forster. **(The agricultural and textile qualities of different varieties of New Zealand flax.)** [English summary 9 ll.]
Bragantia, 1947, **7**: 231-41, bibl. 7.

Marked differences were found in growth and fibre quality of the six varieties grown.

Hops.

2822. SALMON, E. S. 633.79
Thirty-first report on the trial of new varieties of hops, 1947.
East Malling Research Station, Maidstone, Kent, 1948, 16 pp., 1s.

Of the new varieties tested, two, including the early variety OJ47, cropped at the rate of over 27 cwt. per acre, and 13 at over one ton. From 69 to 131 bushels of green hops were required per cwt. of dried hops. Brewer's Stand-by gave a preservative value (P.V.) of 105 and Brewer's Gold a P.V. of 109: many varieties showed high values. Notes are given on varieties resistant to *Verticillium* wilt, the machine-picking of hops, and brewing trials.

2823. SCHAUDER, R. 633.79(687)
Hop production in South Africa.
Food Manuf., 1948, **23**: 463-4, illus.

A brief account of hop cultivation in the George district

of the Cape Province. From the local variety Golden Cluster up to 1,000 lb. dry hops per acre may be harvested. Drought is the main factor which limits yields.

2824. KEYWORTH, W. G. 633.79-1.534
The propagation of hops by layering.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 189-94.
Three methods of layering hop bines are mentioned. One of these has already been described [*ibid.* A27, 1944, pp. 112-14, noted *H.A.*, 14: 1708]; the other two are here fully described and shown diagrammatically.

2825. KEYWORTH, W. G. 633.79-2.8
Nettlehead disease of the hop. A note on the reaction of certain Wye seedling varieties to graft infection.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 150-2, bibl. 4.
Of 18 Wye seedling hop varieties tested at least one plant of every variety showed symptoms, indicating that none is completely tolerant. In the variety Concord, symptoms appeared later and were less severe than in comparable Fuggle plants.

2826. KEYWORTH, W. G., AND HITCHCOCK, M. M. 633.79-2.8
Aerial surveys of the incidence of nettlehead disease of the hop on former hedgerow and pasture sites.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 153-6, illus.
Aerial photographic surveys and ground mapping of outbreaks of nettlehead disease of hop showed that there was a preponderance of diseased plants on the sites of old hedgerows in certain fields, and that in another field there were many more affected plants on a part that had formerly been old pasture than on the formerly arable part.

2827. KEYWORTH, W. G., AND HITCHCOCK, M. M. 633.79-2.4
Verticillium wilt of the hop (*Humulus lupulus*). A note on the incidence of symptoms of fluctuating wilt in early, mid-season and late bine.
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 148-9, bibl. 2.
Late " dressing " and training reduced the number of plants showing symptoms but did not affect the severity of those symptoms.

2828. ISAAC, I., AND KEYWORTH, W. G. 633.79-2.4
Verticillium wilt of the hop (*Humulus lupulus*). III. A study of the pathogenicity of isolates from fluctuating and from progressive outbreaks.
Ann. appl. Biol., 1948, **35**: 243-9, bibl. 3, illus.
Isolates from fluctuating outbreaks of *Verticillium* (*V. albo-atrum*) wilt of hops (*H.A.*, 13: 163) were less pathogenic to young hop plants than those from progressive outbreaks, and it is suggested that this is the main cause of the differences in symptom incidence and intensity between the two types of outbreak in the field.—East Malling Research Station, Kent.

2829. LOWY, B. 633.79-2.6/7
New method for the determination of insect infestation in hops.
Abstract in *Fruit Prod. J.*, 1948, **27**: 324.
Insects can be separated from hop leaves [cones ?] by immersing them in salt water to which a powerful detergent is added.

2830. MASSEE, A. M. 633.79-2.654.2
The hop red spider (*Tetranychus urticae* Koch).
A.R. East Malling Res. Stat. for 1947, 1948, **A31**, pp. 187-8.
Notes on life cycle and control measures. Sprays should be applied in May or early July, with a second application, if necessary, 10 days later. Recommended are (1) lime-sulphur 1 gal., wetter about 6 oz., nicotine (to be added if hop aphid is present) 4 oz., or (2) derris (2% rotenone) 2 lb., wetter 6 oz., per 100 gal. water.

2831. ANON. 632.951: 633.79
New spray with great possibilities.
Fruitgrower, 1948, **106**: 396.
An account of a trial in which hops were sprayed twice with Pestox III, a preparation which contains bis (bisdimethyl-aminophosphonous) anhydride, a systemic insecticide; the spray is intended to control aphids and red spider. [The effect on beer is not reported.]

Herbs and other crops.

(*See also* 3108.)

2832. MINISTRY OF AGRICULTURE, LONDON. 633.8
Culinary herbs and their cultivation.
Bull. Minist. Agric. Lond. **125**, 1948, pp. 13, 6d.
A reprint, with amendments, of the 1942 edition [see *H.A.*, 12: 902].

2833. KRØMDIJK, G. 633.8
De quelques plantes condimentaires. (**Some condiment plants.**)
Courr. hort., 1948, **10**: 360-1, illus.
Notes on the characters, properties and cultivation of aniseed (*Pimpinella anisum*), basil (*Ocimum basilicum*), savory (*Satureia hortensis*), marjoram (*Origanum marjorana*), and fennel (*Foeniculum vulgare*).

2834. SIEVERS, A. F., AND STEVENSON, E. C. 633.822
Mint farming. [Peppermint and spearmint.]
Fmrs' Bull. U.S. Dep. Agric. **1988**, 1948, pp. 30, illus.
In the United States peppermint and spearmint are grown on 47,000 and 14,000 acres of muck soil respectively in Indiana, Michigan, western Oregon, Washington, California and Ohio. Oil yields vary largely from season to season according to weather conditions, the six States having averaged 28·9 lb. of peppermint oil during the 10-year period 1936-45 and Indiana and Michigan 30·1 lb. of spearmint oil during the same period. Cultural requirements of the crops, diseases and pests, harvesting and oil distillation are fully discussed.

2835. VAN BLARICOM, L. O., AND MARTIN, J. A. 633.841: 581.192
Permanent standards for chemical test for pungency in peppers.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 297-8, bibl. 3.
Potassium dichromate and copper nitrate were found to give satisfactory colour standards for testing capsaicin content of peppers. Directions are given for making colour standards with these chemicals.—S. Carolina Exp. Stat.

2836. SMITH, P. G. 633.842
Brown, mature-fruit colour in pepper (*Capsicum frutescens*).
Science, 1948, **107**: 345-6.
One strain of pepper from Mexican material produced fruit which turned a deep chocolate brown at maturity instead of the normal red or yellow. Seedsmen report having observed this phenomenon occasionally in their collections. Preliminary data indicate that the brown fruit colour is due to a single recessive gene, which inhibits the normal chlorophyll destruction at maturity. It is suggested that it should be possible to produce a green mature fruit colour by crossing this strain with a pepper having a yellow fruit colour. Such

a combination would be of value for prolonging the sale period of green salad peppers.—University of California, Davis.

2837. PETROSINI, G. 633.842/3-1.8: 577.16
Sugli effetti della concimazione minerale sopra il contenuto vitaminico dei vegetali: ricerche sui peperoni. **(The effect of mineral fertilizers on the vitamin content of plants: investigation of *Capsicum*.)**
Ann. Chim. appl., 1945, **35**: 4/5: 81-93, bibl. 44.
A review of findings to date is followed by indications given by an Italian trial on *Capsicum frutescens* and *C. annuum* carried out during the war under considerable difficulty. The facts which emerge are that the addition of nitrogenous fertilizer, unbalanced by phosphoric and, especially, potassic fertilizers, results in much diminished vitamin C content. Complete manuring results in increased vitamin C content. The vitamin C content of the different species and varieties of *Capsicum* varies greatly.—Portici.

2838. KÜRÇAY, A. 633.75
Haşhaşlarin kûltür şekline girmesinde Türk çeşitlerinin mevki ve rolü. **(Opium poppy cultivation. Position and part played by Turkish poppies.)**
Çankaya Matbaasi, Ankara (Genel Sayi: **628**), 1946, No. 6, pp. 48.
In 1943 the Yeşilköy Seed Improvement Station began poppy trials with material obtained from local populations from poppy-growing regions in Turkey, the object being to improve the quality of the morphine in Turkish opium poppies. The present paper discusses the problems of classification of *Papaver somniferum*, and its polymorphic characters, as exhibited in *P. somniferum* vars. *genuinum*, *stipitatum*, *officinale* and *Hussenottii*; the areas of cultivation of the plant; and its main botanical characters as found in Turkey and some other countries. [From *Plant Breeding Abstracts*, 18: 391, 1948.]

2839. BALDRATI, I. 633.853.55
La " femminilità " nel ricino. **(Female flowers in castor oil bean.)**
Ital. agric., 1948, **85**: 235-8.
A discussion of variation in the carriage of male and female flowers by different kinds of castor oil bean is followed by a note on " M6 " in which optimum sex distribution is achieved, and the suggestion is made that more attention should be paid to the possible use of the " green " variety [*R. viridis* ?].

2840. MOSS, B. L. 582.73
Studies in the genus *Fucus*. I. On the structure and chemical composition of *Fucus vesiculosus* from three Scottish localities.
Ann. Bot. Lond., 1948, **12**: 267-79, bibl. 12, illus.
Plants from localities differing in exposure differed in structure and composition.

2841. SCHNEIDER, H. 633.913-2.4
Susceptibility of guayule to *Verticillium* wilt and influence of soil temperature and moisture on development of infection.
J. agric. Res., 1948, **76**: 129-43, bibl. 20.
Field experiments in California indicated that the commercial strains of guayule (*Parthenium argentatum*) differ in susceptibility to *Verticillium albo-atrum*. Experiments in constant-temperature tanks showed that the fungus becomes inactive at soil temperatures between 80° and 85° F. Irrigation experiments in field trials seem to show that it is active in soil at all moisture levels above the wilting point. Maintaining the upper soil horizons at the wilting point prevents infection.

Noted.

2842.

a ALCARAZ MIRA, E., AND IZQUIERDO TAMAYO, A. 633.71: 679.7.021.1
El " verdeamiento " del tabaco en los secaderos. (Nueva enfermedad aparecida en nuestro país.) **(The greening of tobacco during curing, a new disease for Spain.)**
Bol. Pat. veg. Ent. agric., 1946, **14**: 369-84, bibl. 13, illus.
Probably due to faulty curing.

b ANON. 633.71
Producing bright cigarette tobacco in the Old Belt.
Circ. N.C. agric. Ext. Serv. **314**, 1948, pp. 6.

c ARMITAGE, H. M. 635.65: 632.76
The Mexican bean beetle in California.
J. econ. Ent., 1947, **40**: 865-9.

d ATKINS, F. C. 635.8: 632.4
A *Verticillium* disease of cultivated mushrooms new to Great Britain.
Trans. Brit. mycol. Soc., 1947, **31**: 126-7, bibl. 3.

e BENNETT, E. R. 633.491
Growing the Idaho potato.
Bull. Idaho agric. Ext. Serv. **141**, 1942, pp. 31, illus. [received 1948].
Includes diagrams of a storage dugout.

f BENNETT, R. R. 633.71 +679.7.021.1
Flue-cured tobacco barn construction.
Circ. N.C. agric. Ext. Serv. **316**, 1948, pp. 22, illus.
Working drawings are given.

g BENNETT, R. R., AND GARRISS, H. R. 633.71(756)
A description of tobacco varieties for North Carolina.
Circ. N.C. agric. Ext. Serv. **302**, 1947, pp. 2.

h BERRY, L. J., GARDINER, M. S., AND GILMARTIN, R. T. 635.25: 631.588.1
Preliminary studies of atypical growth in onion roots subjected to continuous applied electric currents of low intensities.
Growth, 1947, **11**: 155-75, bibl. 39.

i BOULD, C., AND CATLOW, E. 631.8: 633.491 +635.35
Studies on the comparative effects of dung, compost and inorganic fertilizers on crops and soil. 1. Effects on yields and composition of potatoes and cauliflower.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 61-70, bibl. 2.

j CASSERES, E. H. 635.64
Effect of date of sowing, spacing and foliage trimming of plants in flats on yield of tomatoes.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 285-9, bibl. 14; being *Pap. Dep. Veg. Crops, Cornell Univ.*, **287**.

k DE CASTRO, J. B., AND BOOCK, O. J. 633.491
Variedade de batatinha " Konsuragis ". **(The potato variety Konsuragis.)**
Bragantia, 1947, **7**: 151-77, bibl. 21, illus. [received 1948].

l CHOPINET, R., AND TREBUCHET, G. 635.65(44)
Essai de classification et d'identification des principales variétés de haricots cultivés en France. **(Classification and identification of the principal varieties of haricot grown in France.)**
Rev. hort. Paris, 1948, **120**: 230-43, 257-65, bibl. 2.

m COCHRAN, H. L. 633.42-1.84
Effects of fertilizer and method of application of supplementary nitrogen on the yield of turnip greens for canning.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 321-4, bibl. 4.

n COOIL, B. J. 633.913-2.19: 631.83
Potassium deficiency and excess in guayule. I. Growth responses and mineral content. II. Cation-anion balance in the leaves.
Plant Physiol., 1948, **23**: 286-308, bibl. 50; **23**: 403-24, bibl. 35.

o COOIL, B. J., AND SLATTERY, M. C. 633.913-2.19: 631.83
Effects of potassium deficiency and excess upon certain carbohydrate and nitrogenous constituents in guayule.
Plant Physiol., 1948, **23**: 425-42, bibl. 45.

p CRANG, A., JAMES, D. P., AND STURDY, M. 635.48
A comparison of the preserving qualities of certain varieties of rhubarb.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 225-33, bibl. 3.

q DILLS, L. E., AND ODLAND, M. L. 635.34: 632.78
DDT for good control of cabbage caterpillar.
Bull. Pa agric. Exp. Stat. **488**, *Suppl.* **3**, p. 10.

r DORPH-PETERSEN, K. 633.491: 519
Pacelfordeling i Markforsøg. **(Plot arrangements in field trials.)** [English summary.]
Tidsskr. Planteavl, 1948, **52**: 111-75, bibl. 19.
The experimental crops include potato.

s DOUCETTE, C. F. 635.34: 632.76
Host plants of the cabbage seedpod weevil [*Ceuthorrhynchus assimilis*].
J. econ. Ent., 1947, **40**: 838-40.

t ESTRADA, M. 633.491-2.411
El casagui de la papa. **(Potato blight [in Argentina].)**
Rev. mens. B.A.P., 1947, **30**: 357: 19-23, illus.

u FLEURY, C. 635.8: 632.4
Une maladie du champignon de couche (*Psalliota campestris*) non encore décrite en Suisse: la momification. **(First record in Switzerland of the mummy disease of the cultivated mushroom.)**
Rev. hort. suisse, 1948, **21**: 279-82, bibl. 1, illus.

v FRANKENBURG, W. G. 633.71-1.56
Transformation products of nicotine in fermented tobacco.
Science, 1948, **107**: 427-8, bibl. 2.

w GOIDÀNICH, G., AND MEZZETTI, A. 633.491-2.4
La *Spongospora subterranea* in Italia. **(The presence of *Spongospora subterranea* [on potatoes] in Italy.)** [English summary 7 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 237-46, bibl. 4.—Staz. Pat. veg. Rome.

x GRISON, P. 633.491-2.76
La ponte du doryphore et quelques considérations sur l'instinct. **(Oviposition of the Colorado beetle and some remarks on instinct.)**
Parasitica, 1948, **4**: 73-84, bibl. 28.

y GROGAN, R. G., AND WALKER, J. C. 635.656: 32.8
Interrelation of bean virus 1 and bean virus 2 as shown by cross-protection tests.
Phyropathology, 1948, **38**: 489-93, bibl. 12.

z HERKLOTS, G. A. C. [Editor]. 635.561
Watercress. History of introduction and Chinese methods of cultivation in Hong Kong.
Food and Flowers, Hong Kong, No. 2, 1948, pp. 15-20, illus.

2843.

a HUMM, H. J., AND WILLIAMS, L. G. 582.73
A study of agar from two Brazilian seaweeds.
Amer. J. Bot., 1948, **35**: 287-92, bibl. 5.
Hypnea musciformis and *Gracilaria cornea*.

b KRANTZ, F. A., AND EIDE, C. J. 633.491-2.3
Resistance to common scab of potatoes in parental clones and in their hybrid progenies.
Amer. Potato J., 1948, **25**: 294-300.

c KUNKEL, R. 635.25-1.8: 664.84.25
The effect of various levels of nitrogen and potash on the yield and keeping quality of onions.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 361-7, bibl. 10, being *Pap. Dep. Veg. Crops, Cornell Univ.* **288.**

d LYON, C. B., AND BEESON, K. C. 631.811.9: 635.12 + 635.64
Influence of toxic concentrations of micronutrient elements in the nutrient medium on vitamin content of turnips and tomatoes.
Bot. Gaz., 1948, **109**: 506-20, bibl. 34.

e MA, C. C., AND LUI, S. P. 635.34: 632.78
Ecological notes on the cabbage butterfly in Shaowu.
Fukien agric. J., 1947, **8**: 3-4: 42-53.

f MCDERMOTT, N. 633.491-1.5.21
Key for the identification of commercial potato varieties and rogues in the field (United Kingdom).
Publ. Midland School of Agriculture, Sutton Bonington, 1948, pp. 64.

g MACHACEK, J. E. 633.491
Some causes of waste in Manitoba table-stock potatoes.
Sci. Agric., 1948, **28**: 333-9, bibl. 4, being *Contr. Div. Bot. Plant Path. Sci. Serv. Dep. Agric. Canada* **940.**

h MATTINGLEY, G. H. 633.491
Potato varieties in Victoria.
J. Dep. Agric. Vict., 1948, **46**: 193-8.

i MICHELLY, G., AND VON SENGBUSCH, R. 635.13: 631.521
Züchterisch brauchbare chemische Auslesemethode auf hohen Zuckergehalt bei Möhren. **(The selection of carrots of high sugar content by a chemical method useful to the breeder.)**
Züchter, 1946, **17-18**: 78-9 [received 1948].

j MURAYAMA, S. J. 635.561
Cultura do agrião. **(Growing watercress.)**
Rev. Agric. São Paulo, 1948, **23**: 203-5.

k NICHOLAS, D. J. D., AND CATLOW, E. 631.8: 635.1/7
Manurial experiments on vegetable crops.
XI. Effects of farmyard manure and of various fertiliser treatments on cauliflower.
XII. Effects of farmyard manure and of various fertiliser treatments on three varieties of potato.
XIII. Effects of farmyard manure and other manurial treatments on potato and cauliflower. Seasons 1946 and 1947.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 103-9, 110-7, 118-26, bibl. 4, 2, 2.

l NOBREGA, N. R., AND SILBERSCHMIDT, K. 633.71-2.8
Sôbre uma provavel variante do virus " Y " da batatinha (*Solanum virus* 2, Orton) que tem a peculiaridade de provocar necroses em plantas de fumo. **(A suspected strain of potato virus Y (*Solanum virus* 2, Orton), causing necrosis on tobacco.)** [English summary 1½ pp.]
Arq. Inst. biol., 1944, **15**: 307-30, bibl. 20, illus. [received 1948].

m PLANTENZIEKTENKUNDIGE DIENST, WAGENINGEN. 632.793: 635.34
De bestrijding van de knollenbastaardrups in kruisbloemige gewassen. **(Control of turnip sawfly [*Athalia spinarum*] in cruciferous plants.**
Bericht PlZiektkund. Dienst **776,** 1948, 1 p.
By rotenone and by DDT.

n RETIEF, D. F. 633.71-1.8
Methods of fertilizer application for tobacco.
Fmg S. Afr., 1948, **23**: 453-60, 494.

o RIEMAN, G. H. 633.491
Plans for the maintenance of valuable foreign and certain domestic potato breeding stocks.
Amer. Potato J., 1948, **25**: 237-9.

p RÖSSGER, W. 635.1: 581.144
Beschreibung eines Boniturkastens zur Bestimmung des Verholzungsgrades der Kohlrabi-Knollen nach neuer Methode. **(A new apparatus for evaluating the degree of lignification of kohlrabi stems.)**
Züchter, 1946, **17-18**: 25-6, illus.
By comparing the translucence of stem slices the day after cutting.

q SEVERIN, H. H. P. 632.8
Transmission of California aster-yellows virus by leafhopper species in thamnotettix group.
Hilgardia, 1948, **18**: 203-16, bibl. 15, illus.

r SHULL, W. E., AND MANIS, H. C. 633.491-2.7
Potato insect control.
Ext. Bull. Idaho Coll. Agric. **150,** 1945, pp. 10, illus.

s SPANGLER, R. L. 631.564.4: 635.64
Preparation of fresh tomatoes for market.
Fmrs' Bull. U.S. Dep. agric. **1291,** 1948, pp. 48.
Deals chiefly with packing.

t TURNQUIST, O. C. 633.491
Firmness of potato varieties as measured by a pressure tester.
Amer. Potato J., 1948, **25**: 233-6, bibl. 2, being *Pap. sci. J. Ser. Minn. agric. Exp. Stat.* **2384.**

u WALKER, J. C., AND OTHERS. 635.34: 632.48
Yellows-resistant cabbage varieties in the Danish Ballhead-Hollander group.
Circ. U.S. Dep. Agric. **776,** 1948, pp. 12, bibl. 9.
Illustrated description of 6 varieties.

FLORICULTURE.

(*See also* 2353, 2366-2368, 2370, 2392e, p, r, u, 2440, 2665, 3130, 3131, 3136, 3147.)

2844. ANON. 635.9: 656.7
Les cargos fleuris de la K.L.M. **(Flowers transported by the K.L.M. aviation company.)**
Courr. hort., 1948, **10**: 357-9, illus.
Reference is made to a successful attempt in 1922 to transport flowers by aeroplane from Holland for exhibition in Copenhagen, and an account is then given of the present-day methods of packing and transporting horticultural products over long distances by air.

2845. KRUYT, W. 577.17: 635.9: 631.535
Proeven met groeistoffen bij het stekken. **(Tests of growth substances for cuttings.)**
Versl. Vereniging "de Proeftuin" te Boskoop, 1942, pp. 40-78 [received 1948].
The effects of treatment with growth substances on the rooting of cuttings of a wide range of ornamental shrubs and trees are reported.

2846. WURGLER, W. 632.954
La sensibilité de quelques arbres et arbustes envers les acides phénoxyacétiques. **(The susceptibility of some trees and shrubs to phenoxyacetic acids.)**
Rev. hort. suisse, 1948, **21**: 221-6, bibl. 5, illus.
Out of 63 species of trees and shrubs tested only 5 were resistant to applications of phenoxyacetic acid in all developmental stages and at all times of the year. Usually, the phases of greatest sensitivity are bud burst and the period of vigorous shoot growth in spring. Contact of the trees with the hormone may result (1) from insufficiently cleaned sprayers, when traces of the herbicide are unwittingly applied with the insecticide, (2) from herbicidal spraying during a windy spell, (3) from the leaching of the chemical into the root zone of the tree. Suitable precautionary measures are recommended.

2847. BANFIELD, F. S. 635.977
Street trees.
Gdnrs' Chron., 1948, **123**: 6, 14, 22-3.
A discussion of the relative virtues of various trees for roadside planting in towns. Practical details are considered.

2848. WASSCHER, J. 635.9(492)
Aalsmeerse bloemen en haar vermeerdering. **(Aalsmeer flowers and their propagation.)**
Tuinbouw, 1948, **3**: 152-9, illus.
An account is given of the flower production at the Aalsmeer Flower Research Station, with details of the various methods of vegetative propagation used.

2849. WEBSTER, J. L. 631.521: 635.9
Flower seed growing in British Columbia.
Seed Prod. Ser. **15,** [1947 ?], *Dep. Agric. B. Columbia*, pp. 73, bibl. 9, illus.
This booklet is intended as a general guide for new growers in British Columbia, or those with limited experience, but certain sections, e.g. those on cross-pollination, selection, plant breeding, equipment, and botanical classification, should prove valuable even to experienced growers whether in B.C. or elsewhere. Apart from those parts mentioned, there are sections on: history and extent of flower seed growing in B.C.; advice to beginners, climate and suitable districts; soils, fertility and moisture supply; grouping flowers to simplify methods of growing; row widths, spacing and thinning, care up to harvest, harvesting, curing and drying, threshing, cleaning; varieties, types and subspecies; more specific information on 12 important kinds. [The bibliography might with advantage be more detailed.]

2850. ANON. 635.939.183
Eine neue *Primula malacoides*. **(A new *P. malacoides* variety.)**
Gärtnermeister, 1948, **51**: 83-4.
The new variety, a selection from the cross of the varieties Böehnerts Rote × Zürcher Oberland, is described and illustrated by two photographs.

2851. m.m. 635.937.5.11
Vier neue *Pelargonium zonale*. **(Four new *P. zonale* varieties.)**
Gärtnermeister, 1948, **51**: 258.
The 4 new varieties, Maloya, Guarda, Sils and Santa Maria, were produced by a Swiss firm from crosses with the variety Rakete. Brief descriptions and photographs are given.

2852. NOORDAM, D. 635.936.69: 632.4
Vaatziektebestrijding in Amerikaanse anjers. **(Control of wilt in American carnations.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1948, **11**: 444-8, bibl. 11.
In trials to ascertain the reason for unsatisfactory results of sterilizing soil infested with the carnation wilt disease caused by *Phialophora cinerescens* (Wr.) v. Beyma, it was found that ground with wilt-infected carnations can be infested to a depth of 50-75 cm. The disinfection or renewal of such ground must therefore be carried out to a depth of 75 cm. or subsoil taken from below that depth used. Ground may remain infested for 4 years after bearing infected plants.

2853. BONNER, J. 635.938.23
Flower bud initiation and flower opening in the camellia.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 401-8.
The application of recent research makes it possible to produce camellia blooms, which normally appear only in autumn and winter, at all seasons of the year. Flower bud *formation* in the camellia takes place abundantly where plants are maintained at temperatures of 80° or above during the day and 65° or above during the night, but is suppressed at lower temperatures. [From author's summary.]—Calif. Inst. of Technology.

2854. EVERETT, P. 634.74: 635.976
***Monstera deliciosa*—an outstanding ornamental fruiting plant.**
N.Z. J. Agric., 1948, **76**: 487, bibl. 1.
The author considers that, apart from its unique and delicious fruit, this plant is deserving of much wider cultivation in New Zealand for ornament. The plant is briefly described and its propagation (usually by cuttings) discussed. Its only pest in New Zealand is a common thrips (*Heliothrips haemorrhoidalis*), which is controlled by spraying with nicotine sulphate, 1½ teaspoonfuls in a gallon of water.

2855. MEYER, J. R. 585.94: 631.531
Germinação de sementes de orquídeas em recipientes hermèticamente fechados. **(Germination of orchid seeds in hermetically sealed flasks.)**
O Biológico, 1948, **14**: 13-15, bibl. 5, illus.
Orchid seedlings were raised very satisfactorily in glass bottles sealed with varnish over rubber stoppers or glass discs. The medium contained sugar, from which the plants derive CO_2 by fermentation. The main advantages of hermetic seals over sterile cotton are complete security against the entry of fungi, and restriction of water loss.

2856. NOBREGA, N. R. 585.94: 632.8
Uma doença de vírus em orquídea. **(A virus disease of an orchid.)** [English summary 5 ll.]
O Biológico, 1947, **13**: 62, bibl. 1, illus. [received 1948].
A virus disease producing chlorosis, mottle, and whitish flecks on the leaves and stunting in one plant of orchid (*Dendrobium nobile*) is described. The disease was transmitted by sap inoculation to *Nicotiana tabacum* var. White Burley, *N. rustica* and *N. glutinosa*. The symptoms observed on these hosts indicated that the virus is a strain of *Cucumis* virus 1. [Author's abstract.]

2857. HERKLOTS, G. A. C. 635.9(51)
Mexican sunflowers [in Hong Kong].
Food and Flowers, Hong Kong, 1948, No. 1, pp. 12-15, bibl. 1, illus.
A short illustrated note on *Tithonia diversifolia*, a naturalized perennial, and *T. speciosa*, a cultivated annual. The spread of the first-named in Hong Kong is not viewed with alarm—in Ceylon it is a noxious weed.

2858. HERKLOTS, G. A. C. 635.976.32(51)
Some flowering shrubs and climbers, native and exotic [in Hong Kong].
Food and Flowers, Hong Kong, 1948, No. 1, pp. 15-37, illus.
Short descriptions, with 16 illustrations, are given of the following: *Thunbergia* spp. (5), *Stephanitis floribunda*, *Bignonia venusta*, *Duranta repens*, *Malvaviscus conzatii*, *Gardenia jasminoides*, *Hibiscus tiliaceus*, *H. abelmoschus*, *Camellia hongkongensis*, *Tutcheria spectabilis*, *Gordonia anomala* and *Schima noronhae*.

2859. HERKLOTS, G. A. C. 635.974(51)
Bauhinias in Hong Kong.
Food and Flowers, Hong Kong, 1948, No. 1, pp. 4-12, bibl. 1, illus.
Six tree or shrub forms and 5 climbers are described, 5 of them being illustrated. *B. blakeana*, the Hong Kong bauhinia, " is probably the most beautiful tree of this genus in the world ". *B. yunnanensis* is praised as a climber which grows fast, but is not rampant or too heavy, provides an effective wind screen, will climb anywhere without elaborate supports, and is ornamental whether in flower or not.

2860. KAMP, J. R., AND WEINARD, F. F. 635.937.34: 631.542
Further experiments in pruning old rose plants.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 409-10, bibl. 1.
A bench experiment is recorded in which 4 rose varieties, 4 years old, were cut back to 24, 30 and 36 in., the treatments being replicated. The table showing the production of flowers from October to June indicates that varieties do not react in the same way to the treatments, thus one gave most blooms (22) at 36 in. and another (33 blooms) at 24 in. The greater difficulty in handling the taller plants is noted. [The statistical significance of the results is not shown.]—Univ. of Illinois.

2861. SCHENK, P. J. 635.939.124: 632.754
De rhodowants. **(The rhododendron bug.)**
Cultuur Hand., 1947, **13**: 7: 24-5.
An account of the rhododendron bug, *Stephanitis rhododendri*, and its control. The use of 0·1% solution of 95-98% nicotine, with a spreader, is recommended.

2862. VAN MARLE, G. S. 632.654.2: 631.544
Spintbestrijding met azobenzeen in bloemkassen. **(The control of red spider with azobenzene in greenhouses with ornamental plants.)**
Tuinbouw, 1948, **3**: 184-7, illus.
An account of azobenzene and its properties in relation to the control of red spider (based mostly on the work of Blauvelt in America) on plants under glass, particularly carnations, roses, *Gerbera*, *Asparagus plumosus* and *Hydrangea*.

2863. TRIVELLI, G., AND SAVARY, A. 632.654.2
Une nouvelle méthode de lutte contre l'araignée rouge dans les serres: l'azobenzène et son emploi comme aérosol. **(A new method of controlling glasshouse red spider: azobenzene and its application as an aerosol.)**
Rev. hort. suisse, 1948, **21**: 209-16.
At the Lausanne research station an azobenzene aerosol was tested against glasshouse red spider in rose, carnation and mixed flower houses. The data presented confirm the excellent results obtained in America and elsewhere with this insecticide. Three lists of ornamental plants are drawn up: (A) plants on which no damage has been caused by the treatment; (B) plants the flowers of which are susceptible to azobenzene; (C) plants the foliage of which is susceptible to azobenzene.

2864. VAN SLOGTEREN, E. 635.944
Van bol tot bloem, de technische problemen van de bloembollencultuur. **(The treatment of flowering bulb plants.)**
Tuinbouw, 1948, 3: 87-94.
This well illustrated, popular account of the treatment of bulbous flowering plants includes a table showing temperatures at which to store the bulbs of narcissus, tulip, hyacinth and iris, in order to obtain early, later, and very late blooms. The difficulty of maintaining the required temperatures during transport overseas is great.

2865. VLAG, A. F. 635.944
Verslag der broeiproeven over het seizoenjaar 1946-47. **(Report on bulb forcing trials in 1946-47.)**
Meded. Veren. Proefstat. Bloembollencult. Lisse. **11**, 1948, pp. 16, illus.
Tulips.—The earliest to bloom were those cooled to 9° C. in mid-September, planted and held at 9° C. until the tips of the leaves appeared, grown at 13° C. until they reached 3 cm., and thereafter at 17° C.; with this treatment the Mendel varieties Imperator, Superba, and White Sail flowered on 8, 14 and 20 December, 1946, respectively. Not all varieties can be forced thus. The production of blind flowers does not hinder forcing next season. *Narcissus.*—In some varieties the practice of drying the bulbs at 35° C. (primarily for export) before chilling may advance the date of flowering. Manurial trials showed that N has the greatest effect on earliness and quality of flowering.

2866. LOCK, N. F. 635.944
Growing daffodils in a town garden.
J. roy. hort. Soc., 1948, 73: 248-57.
Includes: instructions for growing, a list of suitable varieties, hints on picking for exhibition, and notes on hybridizing, raising seedlings and early forcing.

2867. STUART, N. W. 635.944: 631.8
The effects of Ceresan dips and fertilizer applications on growth, flower production, and basal rot development in narcissus.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 411-5, bibl. 6.
An account of a study to test the effect of certain fertilizer combinations on the growth and flowering of narcissus bulbs, some of which had been treated with a proprietary fungicide to control basal rot (*Fusarium oxysporum*).—U.S.D.A., Beltsville, Md.

2868. BEIJER, J. J. 635.944: 632.19
Het optreden van " spouwers " bij hyacinthen. **(Loose bud of hyacinths.)**
Tuinbouw, 1948, 3: 126-8.
A popular, illustrated description of loose bud, a more detailed account of which has already appeared [*H.A.*, 18: 1301].

2869. STEARN, W. T. 635.735.722: 41.312.1
The botanical names of some lilies.
Gdnrs' Chron., 1948, **124**: 4-5, 12-13, bibl. in text.
Notes on various infringements of the International Rules of Botanical Nomenclature, involving *Lilium*, *Notholirion*, and *Cardiocrinum*.

2870. STUART, N. W. 635.944
Further tests on handling lily bulbs grown in Northwest [U.S.A.].
Reprinted from *Flor. Rev.*, 9 October, 1947, pp. 3.
Oregon-grown Croft and Ace Easter-Lily bulbs potted and stored at 50° F. bloomed sooner and with a higher bud count and on shorter plants than similar bulbs stored for the same length of time in peat. Croft bulbs from plants with one bud in the field produced from 3 to 7·8 buds per plant depending on storage treatment.

2871. STUART, N. W. 635.944: 631.544
Forcing of southern lilies affected by storage temperatures.
Reprinted from *Flor. Rev.*, 18 September, 1947, pp. 2, illus.
A short description of two cold storage trials made with Easter lily bulbs grown in Florida. Bulbs stored at 31° F. bloomed in 93 to 106 days after potting, depending on duration of storage treatment (9 to 18 weeks), and showed no reduction in bud count.

2872. DE FIGUEIREDO, E. R., Jr., AND PEREIRA, H. F. 635.944: 632.754
Notas sôbre *Xanthopastis timais* Cram. (*Lep. Noct.*), praga das Amarilidáceas. **(*Xanthopastis timais*, a pest of amaryllids.)** [English summary 5 ll.]
Arq. Inst. biol., 1944, **15**: 289-98, bibl. 3 [received 1948].
The caterpillars of this moth can be controlled by spraying with a mixture of lead arsenate and Paris green.

2873. MEADLY, G. R. W. 635.944: 632.5
Cape tulip.
J. Agric. W. Aust., 1948, **25**: 22-8, bibl. 10, illus.
Two species of Cape tulip, *Homeria collina* and *H. miniata*, native to S. Africa, originally introduced as ornamental garden plants, are now serious weeds in many parts of Australia. Both are toxic to stock, all parts of the plants being harmful, whether green or dry. Chemical sprays have not proved very successful, and the most effective control measures are grubbing and ploughing.

2874. SÄGESSER, H. 635.944
Cyclame " Winston Churchill ". **(The cyclamen variety Winston Churchill.)**
Gärtnermeister, 1948, **51**: 250-1.
The new cyclamen variety, a selection from a Rokoko × Pabillio cross, was bred and named in Switzerland. The merits of " Winston Churchill " are discussed and illustrated by two photographs.

2875. BARBEY, P. 635.944
A propos de quelques nouveautés de dahlias. **(Some new dahlia varieties.)**
Rev. hort. suisse, 1948, **21**: 7-10.
An account of new varieties from France and Holland being tested at Geneva.

2876. ROLAND, G. 635.944: 632.8
Les virus des taches bronzées de la tomate (*Lycopersicum virus* 3, Brittlebank) et de la mosaïque du concombre (*Cucumis virus* 1, Doolittle) sur dahlia. **(The viruses of tomato spotted wilt and cucumber mosaic on dahlia.)** [Summary in Dutch 7 ll.]
Parasitica, 1948, **4**: 98-102, illus.
The symptoms on a number of varieties of dahlia infected with *Lycopersicum virus* 3 and *Cucumis virus* 1 are described. Sometimes infection is latent. The viruses were identified by using, as test plants, *Nicotiana tabacum* var. White Burley, *N. glutinosa* and *Cucumis sativus*. The symptoms on dahlia are very complex and it is suggested that without a special laboratory it is impossible to carry out satisfactory sanitary measures.

Noted.

2877.
a GROOTENDORST, H. J. 635.976.33
Sortimentstuin. Het sortiment *Cotoneaster*. **(The *Cotoneaster* variety collection.)**
Jaarb. Vereniging " De Proeftuin " te Boskoop, 1946, pp. 53-68 [received 1948].

b INGWERSEN, W. E. T. 635.967.2
Rock garden plants.
J. roy. hort. Soc., 1948, **73**: 274-83.

c KAMP, J. R., AND HALL, S. W. 635.939.516
Effect of season on responses of snapdragons to topping.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 398-400, bibl. 1.

d KRUYT, W. 635.9: 631.535: 577.17
Het stekken van Berberis. (**Barberry cuttings.**)
Reprinted from *De Boomkweekerij* No. 5, October, 1945, pp. 6, illus. [received 1948].

e KRUYT, W.
De invloed van groeistoffen op stekken van *Laburnum vossii*. (**The effect of growth substances on cuttings of *Laburnum vossii*.**)
Reprinted from *ibid.*, No. 12, 1 February, 1946, pp. 7, illus. [received 1948].

f KRUYT, W.
De invloed van groeistoffen op stekken van bonte en groene hulst. (**The effect of growth substances on variegated and green holly.**)
Reprinted from *ibid.*, No. 13, 15 February, 1946, pp. 6, illus. [received 1948].

g KRUYT, W.
Het vermeerderen van clematis. (**Propagating clematis.**)
Reprinted from *ibid.*, No. 18, 26 April, 1946, pp. 5, illus. [received 1948].

h LEWIS, R. D. 635.9(764)
Ornamentals for Southwest Texas.
Bull. Tex. agric. Exp. Stat. **695**, 1947, pp. 64, bibl. 7.

i (RIJKSTUINBOUWSCHOOL, LISSE.) 635.944: 631.8
Verslag van de N.P.K. bemestingsproef in 1944/1945 te Lisse met Narcis " King Alfred ". (**Report on the NPK manurial trials in 1944/1945 at Lisse with the narcissus King Alfred.**)
Meded. Rijkstuinbouwschool Lisse **10**, pp. 8 [received 1948].

j PILET, P. E. 577.17: 631.535
Essais de bouturage de *Cereus* spec. et *Phyllocactus* spec. (**Rooting cuttings of *Cereus* sp. and *Phyllocactus* sp.**)
Rev. hort. suisse, 1948, **21**: 278-9, bibl. 4, illus.
With the aid of a growth substance.

k ROMEO, A. 635.976: 631.541
L'innesto del ligustro sul lillà. (**Grafting privet on lilac [and the resulting composite plant back on to privet again].**)
Ann. Fac. Agrar. Portici, 1939/40, **12**: 268-71, bibl. 4 [received 1948].

l WATKINS, J. V. 635.931(759)
Annual flowers [in Florida].
Bull. agric. Ext. Serv. Univ. Fla **133**, 1947, pp. 50, illus.
Simple directions for the cultivation of 72 flower species.

SUB-TROPICAL CROPS.

(*See also* 2345, 2454, 2523, 3116, 3126, 3128.)

Citrus and other fruits.

2878. WATTS, A. T. J. 634: 551.566.1
A small holding of sub-tropical fruit.
N.Z. J. Agric., 1948, **76**: 559-61.
An account of an eight-acre holding on the Avondale flat, near Auckland City. The crops grown are passion fruit, grapefruit, lemons, Omi Kin Kan oranges, mandarins, Meyer lemons, tree tomatoes, grapes, persimmons, Chinese gooseberries, and plums.

2879. MOREIRA, S., GURGEL, J. T. A., AND DE ARRUDA, L. F. 634.3: 581.163
Poliembrionia em citrus. (**Polyembryony in citrus.**) [English summary 11 ll.]
Bragantia, 1947, **7**: 69-106, bibl. 28, illus. [received 1948].
The incidence of polyembryony in citrus varieties and species shows very considerable variation between trees of the same variety and also between fruits and seeds of a single tree. Seasonal variations also occur. Sampling methods are discussed. In this study the number of embryos was determined by an inspection of the seeds. Many embryos fail to germinate, so that counts of seedlings give low estimates of the degree of polyembryony.

2880. JOHNSTON, J. C. 634.3: 581.163
What are nucellar seedlings ?
Calif. Citrogr., 1948, **33**: 281, illus.
Because of the rapid increase in the number and extent of known and suspected virus diseases of citrus in California it is increasingly important to use disease-free propagating material and to explore every means for eliminating disease from infected bud lines. The possibility of establishing disease-free bud lines from infected lines by means of nucellar, or asexual, seedlings is attracting much attention in California at present. The occurrence of nucellar seedlings, their increased vigour, and their potential value are discussed.

2881. TEAGUE, M. M. 634.3
Difficulties in the replacement of old citrus orchards.
Calif. Citrogr., 1948, **33**: 280, 300-1.
An outline of the problems involved and a list of some of the steps taken by one company in California in the hope of solving the problem.

2882. PLAUT, N. 634.31: 581.162.3: 577.17
Experiments with unfruitful Valencia orange trees.
Palestine J. Bot. (*R*), 1947, **6**: 58-62, bibl. 9.
The experiments were divided into (1) pollination studies and (2) treatments with synthetic growth substances. Neither cross-pollinations with pollen of Dancy, Duncan, and sour orange, nor breaking of the styles, increased the yield. The breaking of the styles produced interesting results in respect of fruit quality. Spraying with emulsions of α-naphthaleneacetic acid, naphthoxyacetic acid and 2,4-dichlorophenoxyacetic acid had no striking effect on the fruit yield.

2883. BARTHOLOMEW, E. T., SINCLAIR, W. B., AND TURRELL, F. M. 634.3-2.19
Granulation of Valencia oranges.
Calif. Citrogr., 1948, **33**: 322-5.
A summary of results from studies of various factors in their relation to the presence and control of granulation in Valencia oranges. Apparently granulation, under various names, is present wherever citrus is grown, and no adequate method of control has yet been found. In California the nearest approach to a control measure is achieved by picking the large fruits early, especially on the north and inside of the trees.

2884. EVERETT, P. 634.3-1.459
Checking soil erosion in citrus orchards.
N.Z. J. Agric., 1948, **76**: 478.
Methods of control are (1) the maintenance of soil organic matter at a high level (blue lupin suggested as a cover crop);

(2) the restriction of cultivation to weed control; ridges left by cultivation should be across the slope; (3) the breaking of long slopes into shorter sections by constructing low banks or surface drains at intervals down the slope on carefully-surveyed lines providing a very gentle fall for excess water.

2885. STEWART, W. S., KLOTZ, L. J., AND HIELD, H. Z. 634.31-1.55: 577.17
Washington Navels—2,4-D water sprays to reduce preharvest drop of oranges.
Calif. Agric., 1948, **2**: 7: 5, illus.
Trials with 2,4-D carried out in 1946-47 are quoted, in which the reduction in fruit drop ranged from 27 to 96%, according to the orchard, and such factors as season, age of trees and earlier cultural conditions. Pending the results of further experiments no recommendation is made.

2886. ROSSETTI, V. 634.3-1.541.11-2.8
Porta-enxertos de Citrus resistentes à " gomose " de Phytophthora e à " tristeza ".
(Citrus rootstocks resistant to gummosis and to tristeza.)
O Biológico, 1947, **13**: 89-90.
A resumé of a paper—Estudos sôbre a podridaõ do colo dos Citrus I. Suscetibilidade de diversas espécies citricas a algumas especies de *Phytophthora* (Studies on citrus gummosis I. Susceptibility of various citrus species to some species of *Phytophthora*), *Arq. Inst. Biol.*, 1947, **18**, in press. A large number of varieties and open pollinated progenies of various citrus species were inoculated with six *Phytophthora* spp. Susceptibility was measured by the area of lesions produced. In a second experiment, 28 varieties of sweet orange were inoculated with the *Phytophthora* sp. most pathogenic in the first test (in most cases *Phytophthora citrophthora*). Thirty limes or sweet limes were similarly tested. Among the five varieties of sweet orange most resistant to the disease, Pêra and Natal are recommended as rootstocks; they are vigorous and produce a copious supply of easily germinated seeds.—Instituto Biológico, São Paulo.

2887. NADEL-SCHIFFMANN, M. 634.31-2.411
Phytophthora hibernalis.
Palestine J. Bot. (*R*), 1948, **6**: 148-57, bibl. 11, illus.
A species of *Phytophthora* isolated in Palestine from lemons and Shamouti oranges was identified as *P. hibernalis* Carne. Chlamydospores, not hitherto mentioned in the literature on *P. hibernalis*, are described. The rate of development of *P. hibernalis* was tested between 3° and 25° C. It was found to develop between 3° and 23° C., with an optimum between 18° and 21°. *P. hibernalis* isolated from lemon fruits may cause rot not only on lemon, but also on Shamouti and Valencia oranges, and on grapefruit. [From author's summary.]

2888. WAGER, V. A. 634.3-2.4
The black spot disease of citrus [in S. Africa].
Fmg S. Afr., 1948, **23**: 386-90, bibl. 3, illus.
A fungus disease, caused by *Phoma citricarpa*, which has been known in the mist-belt of Natal since 1929. It was reported from Transvaal in 1945 and seems likely to spread throughout S. Africa. The disease attacks the rind of the fruit, making it unsightly. Infected fruit drops and quickly goes mouldy. The mode of infection, the effect of temperature, and the susceptibility of different varieties are discussed. Control measures suggested: pick fruit from infected orchards early and pick sunny side of tree first; induce early maturity of fruit by spraying with lead arsenate (1 lb. in 100 gal. water) every third year; spray with bordeaux (2 : 1 : 80) or copper oxychloride 50% (1 lb. in 80 gal.) at ¾ petal fall, and again 6 and 12 weeks later. White oil, for scale control, can be added (1 : 40 gal.) to the 3rd spray. Planting material should not be obtained from an infected area.

2889. LITTAUER, F., NADEL-SCHIFFMANN, M., AND MINZ, G. 634.31-2.4
The mode of infection of Shamouti oranges by *Diplodia*.
Palestine J. Bot. (*R*), 1948, **6**: 158-64, bibl. 8.
Inoculations of *Diplodia* (with and without wounding) were made on various parts of the stem-end of Shamouti oranges. Fruits treated with different inocula were kept at relative humidity levels of 100% and 80-90%. All such inoculations were successful at both relative humidities. The success of inoculations without wounding greatly varied, but was more pronounced at the higher than at the lower humidity. The success of these inoculations was influenced by fruit maturity, being higher in the second part of the season. The amount of rot and its rate of development were noticeably higher in fruit picked by Harvey clippers than in that picked by ordinary ones. All inoculations by *Diplodia* through the rind were successful. Inoculations without wounding on the surface of the fruit were in general unsuccessful. [From authors' summary.]

2890. MINZ, G., NADEL-SCHIFFMANN, M., AND LITTAUER, F. 634.31-2.4
The incubation period and rate of development of *Diplodia* in Shamouti oranges.
Palestine J. Bot. (*R*), 1948, **6**: 165-9, bibl. 8.
The length of the incubation period and of the period between inoculation and total fruit decay was studied in three seasons on Shamouti oranges inoculated with *Diplodia natalensis*. The level of temperature, and sometimes the stage of fruit maturity, affected the length of these periods. No marked differences resulted from the use of five different inocula. The most favourable temperatures for rot development in Shamouti oranges ranged from 18° to 35° C. [From authors' summary.]

2891. GOIDÀNICH, G., AND RUGGIERI, G. 634.3-2.4
Il carattere della resistenza dei *citrus* al parassitismo della *Deuterophoma tracheiphila* Petri.
(The character of citrus resistance to *D. tracheiphila*.) [English summary 11 ll.]
Ann. Sper. agrar., 1947, **1** (N.S.): 473-84, bibl. 17.
The authors found that the juice extracted from the cortex and wood of both sweet orange (resistant) and sour orange (susceptible) in each case stimulated the germinative and growth capacity of the fungus, there being no appreciable difference in this respect between the two juices.—Staz. Pat. veg. Rome.

2892. MENEGHINI, M. 634.31-1.541.11-2.8
Reação de amido nas enxertias de " seedlings " de laranjeira utilizades em experiências de transmissao da " tristeza ". **(Starch reaction of grafted orange seedlings used in experiments on the transmission of tristeza.)**
O Biológico, 1947, **13**: 91-2, bibl. 7, illus.
Tests with small seedling orange grafts infected with " tristeza " (*ibid.*, 1946, 12: 285-7; *H.A.*, 18: 617) showed a lack of starch in the stock, which is a symptom of quick decline.—Instituto Biológico, São Paulo.

2893. MENEGHINI, M. 634.3-2.8
Experiências de transmissão da doença " tristeza " dos citrus pelo pulgão preto da laranjeira.
(Experiments on transmission of the tristeza disease of citrus by the black orange aphid [*Aphis tavaresi*].) [English summary 20 ll.]
O Biológico, 1948, **14**: 115-8, bibl. 7.
The transmission of tristeza by *Aphis tavaresi* is confirmed. The virus remained infective in the aphid during starvation for 24 hours; after 48 hours infectivity was greatly decreased. Sweet and sour orange seedlings were infested with infective aphids 45 days before grafting sweet scions on sour stocks. When both stock and scion had been infested all plants

became diseased. Of the ten combinations where only the scions had been infested, nine became diseased. When only the stocks were infested two out of ten plants were diseased. The starch reaction was not positive in some plants that appeared to be diseased.

2894. BERTELLI, J. C. 634.3-2.8
Notas fitopatologicas—Primer agregado al estudio de la etiologia de la "podredumbre de las raicillas" o "tristeza" de los citrus. **(Phytopathological notes—First report on the etiology of the root rot or tristeza of citrus.)** [English summary ½ p.]
Publ. Direc. Agron. Minist. Ganad. Agric. Uruguay **91**, 1947, pp. 16, bibl. 4, illus.

The absence of starch in citrus roots was not a specific test for tristeza; shortage of starch occurred also in the roots of trees suffering from psorosis, or excessive nitrogenous manuring. Manuring did not assist recovery. No conclusions can yet be drawn from trees in which the sour orange stock has been allowed to develop leafy branches. Trees infected with tristeza and inarched with sweet orange and trifoliate seedling stocks in 1940-41 are beginning to recover. Leaf symptoms of tristeza were observed on certain combinations at Salto, but only during one season.

2895. MENEGHINI, M., AND SILBERSCHMIDT, K. 634.31-2.8
Contribuição para o conhecimento do metabolismo do nitrogênio em laranjeiras atacadas pela "tristeza". **(Nitrogen metabolism in orange trees affected by tristeza.)** [English summary 3 pp.]
Rev. Agric. São Paulo, 1948, **24**: 139-76, bibl. 35.

Analyses were made of bark samples from stocks and scions of healthy and diseased Baianinha oranges on sour orange stock at the Limeira Experimental Station. Determinations of protein and non-protein N showed that the bark of diseased trees contained less N, particularly in the stocks. In diseased trees the difference between the N-content of stock and scion was insufficient to indicate a real accumulation of N-substances above the union. Diseased trees had a significantly greater water content in the bark than healthy trees; this difference was more marked in comparing stocks, indicating that the union impedes the transpiration stream in diseased trees.

2896. MCALPIN, D. M. 634.3-2.8
Bud-union decline disease of citrus trees.
J. Dep. Agric. Vict., 1948, **46**: 236.

This disease, first noticed in Victoria in 1941, appears to be similar to "quick decline" in California, "tristeza" in South America, and "incompatibility" in South Africa, and is causing severe loss of orange and grapefruit trees on sour orange or Seville rootstocks. The leaves turn yellow and the whole tree dies. The disease may be spread by budding, but its rate of spread in Victoria indicates that some other agent is involved. Scions of sweet orange, grapefruit and mandarin, when grown on either sour orange or common lemon rootstocks, are susceptible. Trees of susceptible scion-stock combinations should not be bought. Eureka and Lisbon lemon trees should not be budded over to sweet orange, grapefruit, or mandarin. Trees on sweet orange and rough lemon are not susceptible to this disease, nor are lemons on any rootstock.

2897. MYBURGH, A. C. 634.3-2.78
The study of a new method of controlling the false codling moth [*Argyroploce leucotreta*].
Citrus Gr, 1948, No. 170, pp. 1-3; No. 171, pp. 5-6, 12.

This citrus pest, long known in the Eastern Cape Province of S. Africa, has recently increased to an alarming extent. In experiments carried out in 1947 the pest was controlled by spraying, the treatments being gammexane, DDT, and fixed nicotine.

2898. RONEY, J. N., AND LEWIS, H. C. 634.3-2.73
Citrus thrips in Arizona.
Calif. Citrogr., 1948, **33**: 302.

In Arizona citrus thrips normally cause considerable damage. Control in recent years has been obtained by using tartar emetic, but it now appears that in many districts thrips are becoming resistant to this. Where tartar emetic has failed, the use of 8 lb. 50% wettable DDT per acre is recommended, applied towards end of petal fall in 100 gal. water per acre using a spray-duster, or in 200 to 300 gal. per acre through a conventional sprayer. Dusting with 2% DDT in sulphur at the rate of 100 lb. per acre is also usually effective. The danger of cottony cushion scale building up in California following the use of DDT is mentioned.

2899. HUTCHINSON, R. N. 634.3-2.752
Influence of winter night temperatures on the California red scale [*Aonidiella aurantii*].
J. econ. Ent., 1947, **40**: 921-2, bibl. 2.

Red scale population density in citrus orchards in the Covina Valley was inversely correlated with the number of nights during which the temperature dropped to 32° F. or lower in the period 15 November to 1 March during the 3-year period covered in this study. It is possible that the density of red scale populations in the following summer, within a given thermal belt, might be forecast on the basis of the number of cold nights during the winter in that particular belt. [From author's conclusion.]

2900. YUST, H. R., AND OTHERS. 632.752: 632.944
Influence of various exposure-concentration combinations on the mortality of the California red scale in HCN fumigation.
J. econ. Ent., 1947, **40**: 869-74, bibl. 10.

Laboratory tests were made of the mortality of the California red scale, *Aonidiella aurantii*, when exposed to HCN. In field trials with the usual duck tents there was little difference between kills after 25 and 45 minutes, but with semi-gastight, plastic-coated coverings the kills were significantly greater after the longer exposure.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2901. MARCHIONATTO, J. B. 634.31-2.8-2.651.3
La podredumbre de la raicilla de los citrus provocada por el "*Tylenchulus semipenetrans*". **(Citrus root rot caused by *Tylenchulus semipenetrans*.)**
Publ. Inst. San. veg. B. Aires, Ser. A, **35**, 1947, pp. 5, bibl. 10, illus.

Very similar symptoms may be exhibited by sweet oranges on sour orange stock infected with tristeza, and by sour orange seedlings infested with the nematode *Tylenchulus semipenetrans*. In Argentina the importance of the nematode should not be underestimated.

2902. DEPARTMENT OF AGRICULTURE, TRINIDAD. 634.3-2.64
Snails attacking citrus.
Proc. agric. Soc. Trin. Tob., 1948, **47**: 86-7, being reprint of *Serv. Leafl., Dep. Agric. Trin. ent. Ser.*, **4** of 1946.

An account is given of snails, unidentified, attacking grapefruit and orange trees in Trinidad and causing serious bark damage on small branches and twigs. Die-back and fruit-shedding may follow an attack. Poisoned baits, made from 1 oz. metaldehyde mixed with 3 lb. of moistened bran, placed towards the ends of the branches have proved of value in controlling the pest. Spraying with bordeaux oil-emulsion is also effective, but expensive and troublesome.

2903. REICHERT, I., AND PALTI, J. 634.3: 582.9
The control of lichens in citrus groves. Preliminary work.
Palestine J. Bot. (*R*), 1947, **6**: 222-4, illus.

The copper compound Perenox at ¼ %, applied at the rate of 30 litres per (" small ") tree, was satisfactory in controlling the lichen, *Xanthoria parietina*. It was even more effective when combined with WA white oil.—Palestine.

2904. CASTELLANI, E. 634.462-2.4
L'antracnosi del carrubo. **(Anthracnose of carob.)**
Rev. Agric. subtrop., 1948, **42**: 81-91, bibl. 14, illus.
The author describes a leafspot disease of *Ceratonia siliqua* due to a *Colletotrichum*, probably *C. gloeosporioides*. He does not suggest a control.

2905. AGNEW, G. W. J. 634.651
Papaw culture in Queensland.
Qd agric. J., 1948, **66**: 208-26, illus.
A comprehensive article touching, briefly, on the following aspects of the subject: pistillate, staminate and bisexual flowers and plants, fruit and seed setting, raising seedlings, planting, spacing, tree positions for dioecious and hermaphrodite plants, determining sex of plants in the field, flower production and fruit set, fruit development, yields, harvesting, branching, cutting back, soil and fertilizer requirements, cultivation.—Hort. Branch, Dep. of Agric. and Stock, Queensland.

2906. WILLS, J. M. 588.427(943)
Passion fruit growing in Southern Queensland.
Qd agric. J., 1948, **66**: 325-50, illus.
This detailed account of passion fruit growing is based on an earlier article (Barnes, H., and Wills, J. M. Passion fruit growing in Queensland; *ibid.*, 1945, 60: 17-41; *H.A.*, 15: 1216). The practice of interplanting young seedlings between older vines is not recommended; later plantings should be on fresh ground isolated to reduce exposure to disease. A table of the monthly yields of 700 vines spaced at 9 ft.×16 ft. shows an average of half a bushel of fruit per vine per year.

2907. ESTRADA, M. 634.653
La palta serrana. **(The mountain avocado.)**
Rev. mens. B.A.P., 1947, **30**: 361: 6-7, 28; 30: 362: 26-8, illus.
An account of observations during the last 25 years, particularly at the Yacanto experimental orchard on varieties of avocado imported and trees raised from seeds, with the object of raising varieties suitable for cultivation in the mountainous regions of central Argentina. Fruit characters required and the reaction of varieties to frost are noted.

2908. REUTHER, W. 634.62
The mineral composition of date palm foliage.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 137-44, bibl. 8.
Preliminary experiments for the purpose of evolving a sampling technique are discussed.—Orlando, Fla.

Tung oil.

2909. POTTER, G. F. 633.85(73)
Research on problems of tung production and improvement, 1938-1946 [in U.S.A.].
Proc. Amer. Soc. hort. Sci., 1947, **50**: 443-57, bibl. 55.
The report of a presidential address reviewing the history and growth of the U.S.A. tung industry, and the achievements of research. There is a useful bibliography.

2910. MERRILL, S., Jr. 634.85: 632.118
Breakage of tung trees by hurricane winds in relation to variety, pruning method, and crop.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 145-51, bibl. 3.
Differences in resistance to breakage were found to be slightly varietal but much more to depend on type of pruning. Trees trained to vase shape were particularly susceptible.

2911. GRUEN, F. H. 633.85
Tung nuts.
Agric. Gaz. N.S.W., 1948, **59**: 320-1.
The potential value of tung production in New South Wales is so great that efforts should be made to reorganize it on sound economic lines. Tung is well suited to the north coast of the State and its cultivation could be expanded there. High-yielding strains [species not stated] are now available and the most suitable districts and locations can be well defined. Shortage of labour in the past made collection of nuts difficult, but a mechanical picking up machine is now being developed by the Museum of Technology and Applied Science.

2912. NEARPASS, D. C., DROSDOFF, M., AND BROWN, R. T. 633.85-1.85
Effect of fertilizing tung trees with potash and other materials on the exchangeable cation content of Red Bay fine sandy loam.
J. Amer. Soc. Agron., 1948, **40**: 771-7, bibl. 10.
Fertilization of tung trees growing on Red Bay fine sandy loam with 2·94 and 5·88 lb. per tree of K_2O, whether as muriate or sulphate, over a 4-year period produced significant increases in exchangeable K to depths of 12 and 18 in., respectively. Vetch mulch did not increase the soil K. Crotalaria mulch increased the soil K in the 6- to 12-in. and the 12- to 18-in. depths but not in the surface layer. No consistent differences were noted between muriate and sulphate of potash as to their effect on soil K. Increasing the nitrogen applied as fertilizer decreased the K content of the tung leaves. The K content of the leaves was found to increase significantly with the quantity of potash applied as fertilizer and with the quantity of exchangeable K remaining in the soil at all depths down to 18 in. [Authors' summary.]

2913. LI, L-Y. 633.85-1.541.5
A note on budding tung trees.
Lingnan Sci. J., 1948, **22**: 143-6, illus.
A note of the author's practical work at Auckland, N.Z., in 1942-1943. He summarizes as follows:—In New Zealand, starting with the germination of seeds in October, tung (*Aleurites fordii*) seedlings attain suitable size for budding in March of the following year. The trees have been successfully budded by the " barn-door " patch, ordinary patch, and inverted " T " shield methods either in the autumn or spring. The " barn-door " patch method [Potter's description of the method is given with illustration] proved especially successful when the scion had a thinner bark than that of the stock. Both one-year-old and two-year-old budsticks were used. A simple method of packing budstick to send by post is also included. It required from two to three weeks for the buds to " take " in the autumn and about ten days in the spring. Forcing was done towards the end of September by cutting the stem back to a distance of four inches above the bud-union. The spring-budded plants were forced as soon as the bud-union was complete. Budded plants made rapid growth and were ready for transplanting at the completion of the growing season.

2914. LI, L-Y. 633.85-1.531
The influence of stratification of tung-seeds upon emergence and establishment of seedlings in the nursery.
N.Z. J. Sci. Tech., 1944, **25**, Sec. A, pp. 43-8, bibl. 5.

Mere stratification of tung seed had a favourable effect on the emergence and final establishment of seedlings planted both out of doors and in sphagnum moss in the glasshouse. Although results of stratification at 32° F. and 38° F. were slightly better than those of stratification at room temperature, which varied from 40° to 65° F., the expense of cold storing may make such a practice uneconomic.—Plant Diseases Division, Auckland.

Bamboos.

2915. McClure, F. A. 633.584.5
Bamboos for farm and home.
Yearb. U.S. Dep. Agric. 1948, pp. 735-40.
An introductory note on utilization and world distribution is followed by brief descriptions of some native and introduced bamboos of the Western Hemisphere.

2916. White, D. G. 633.584.5-1.535
Propagation of bamboo by branch cuttings.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 392-4, bibl. 3, illus.
Certain disadvantages of propagating bamboos by divisions can be overcome in some instances by using branch cuttings. In the experiments reported each branch cutting was severed as closely as possible to the parent culm with a hacksaw and cut off at 12 to 18 in. from the enlarged base. Nine species of bamboo were tested. The results indicate that: treatment with root-promoting substances at the usual concentrations has no effect, considerable variation in rooting exists among species, rooting varies with the month cuttings are obtained, the best month for rooting cuttings varies with the species, and rooting may be associated with rainfall during the month previous to obtaining the cuttings.—U.S.D.A., Puerto Rico.

Noted.

2917.

a Cooley, J. S., and Kushman, L. J. 664.84.22
Effect of storage temperatures on the sprouting of four varieties of sweetpotatoes.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 311-3, bibl. 1, illus.

b Engelbeen, M. 633.85
Les bases de l'amélioration d'*Aleurites montana* (Lour) Wils au Kivu (Congo belge). **(Methods of improving *Aleurites montana* at Kivu, Belgian Congo).**
Agricultura Louvain, 1948, **46**: 1-29, from abstract in *Bull. agric. Congo belge*, 1948, **39**: 472-3.

c Kiely, T. 634.31-2.4
***Guignardia citricarpa* N. Sp. and its relationship to the black spot disease of citrus in coastal orchards of New South Wales.**
J. Aust. Inst. agric. Sci., 1948, **14**: 81-3, illus.

d Scott, F. M., Schroeder, M. R., and Turrell, F. M. 634.31: 581.45
Development, cell shape, suberization of internal surface, and abscission in the leaf of the Valencia orange, *Citrus sinensis*.
Bot. Gaz., 1948, **109**: 381-411, bibl. 53, illus.

e Sell, H. M., and others. 633.85: 581.145.2
Changes in chemical composition and biological activity of developing tung fruit with reference to oil synthesis.
Plant Physiol., 1948, **23**: 359-72, bibl. 28.

f Woglum, R. S., and others. 634.3: 632.963: 632.951
The effect of field-applied insecticides on beneficial insects of citrus in California.
J. econ. Ent., 1947, **40**: 818-20.

TROPICAL CROPS.

(*See also* 2342, 2358, 2373, 2634-2638, 2642, 2660g; j, 3123, 3132, 3134, 3136, 3153.)

General.

2918. (Plantkundig Instituut, Buitenzorg.) 63(922)
Werkprogramma voor 1948 van het Plantkundig Instituut van het Algemeen Proefstation voor de Landbouw. **(Programme of work for 1948 of the Botanical Institute of the Buitenzorg Agricultural Research Station.)** 1948 [?], pp. 12.
The two main divisions of the work of the Botanical Institute are (1) cyto-genetical, geographical and systematic in connexion with plant breeding, and (2) physiological in connexion with soil fertility and plant breeding. In *Citrus* the work concerns:—Resistance to gummosis—rooting cuttings of 6 stocks resistant to *Phytophthora*, and top working several full-grown trees of Japanese citron on rough lemon to provide seed of these resistant stocks. Raising the F_2 from grapefruit and backcrosses with djeroek delima, resistant to bark diseases. Rooting cuttings of djeroek limo and djeroek seger besar, and studies of pollination and fertility of the latter. *Mango*—Work on fruit setting, fruit fall and polyembryony. *Derris*—Collection and cytological study, breeding. *Tung*—Cytological investigation of partial sterility of hybrids between *Aleurites montana* and *A. fordii*. *Cloves*—Variation in local and Zanzibar cloves. Distribution of rainfall and periodicity of flowering and flushing. Distribution and chemical composition of wild cloves. Hybridization. *Potato*—Crosses between *Solanum tuberosum* and other species of this genus, in conjunction with the Plant Breeding Institute at Wageningen. *Lemon grass*—The breeding programme is based on the use of a collection of wild grasses that produce viable seed, as only the pollen of cultivated lemon grass is fertile. *Sweet potato*—Work on self- and cross-sterility in connexion with breeding. Vegetative propagation—General studies to speed up the propagation of desirable material. Other projects concern rice, green manures, and nitrogen-fixing bacteria.

2919. Toxopeus, H. J. 631.52: 576.356.5
Verdubbeling van het aantal chromosomen en de veredeling van tropische cultuurgewassen. **(Chromosome doubling and the improvement of tropical crops.)** [English summary 1 p.]
Landbouw, 1948, **20**: 165-72, bibl. 1.
A list is given of tropical crops that might be improved by chromosome doubling. The criteria for inclusion are:—heterozygosity, low chromosome number, product independent of seed production. Most of the species included can be propagated vegetatively; others are so productive of seed that low fertility of the tetraploid could be tolerated.

2920. Toxopeus, H. J. 633.8/9: 631.52
Over de plantmateriaal-positie van enige overjarige handelsgewassen, die snel in productie komen. **(The availability of planting material of some perennial economic crops that come into production quickly.)**
Landbouw, 1948, **20**: 133-48, being *Meded. algem. Proefstat. Landb.* **72.**
An account of what material survived the Japanese occupation, with notes on rates of multiplication. *Derris elliptica*—The Ngawi type produced 2·28 q./ha. of rotenone (24·5 q./ha. of root), which was twice the average yield of any other type. Cuttings 25 cm. long are used, and the multiplication factor is at present only 6·5. *Amorphophallus*

oncophyllus—Rapid multiplication is possible by means of seed and bulbils. *Andropogon nardus*—Productive clones are available. *Boehmeria nivea*—Selected clones survive, and much seedling material was raised during the occupation. Propagation is being studied. *Chrysanthemum cinerariaefolium*—Pyrethrum has grown well in small tests. Fifty cuttings can be taken from a seedling in a year. *Pachyrrhizus angulatus*—The yam bean produces seed more freely if allowed to climb; yields range from 6·7 to 20 q./ha. Material is being multiplied for further trials. *Mundulea sericea*—This plant sets good seed freely. Two strains from Tanganyika are available. *Clausena anisata*—At the age of six months seedlings of *C. excavata*, which seeds freely, can be budded with *C. anisata*, which produces few seeds.

2921. HOCKING, K. S. 632.951
Progress Report No. 4.
Mim. Colonial Insecticide Research Unit, Entebbe, Uganda, 1948, 8 pp.

Horticultural research in progress has reference to an attempt to determine the degree of permanency of DDT and BHC deposits on vegetation after exposure to direct sunlight and to rain. Leaves of young coffee plants (*C. robusta*) have been treated with DDT preparations at a trial dosage of 50 mg. per sq. foot of leaf surface.

2922. HOCKING, K. S. 632.951
Progress Report No. 3.
Mim. Colonial Insecticide Research Unit, Entebbe, Uganda, 1947, 12 pp.

In a note on the application of DDT to vegetation it is stated that during field trials there was a considerable loss of the insecticide applied as an oil solution by absorption into leaves. There is some evidence that small amounts of DDT are transferred from the inside of treated leaves to untreated leaves at the growing point.

2923. CRAFTS, A. S. 633.954
Weed control in the tropics.
Science, 1948, **107**: 196-7, bibl. 6.

The following oil emulsion contact spray, formulated earlier by the author, will kill most weeds in Puerto Rican sugar cane, coffee, pineapple and banana plantations without injuring the crop plants, provided the latter have reached a height of 1 ft. or more. Medium gravity, highly aromatic oil 30 lb., pentachlorophenol 2 lb., Oronite wetting agent 2 lb., and water 95 gal. This concentration is, however, insufficient to eradicate the cane weeds, bejucos (*Ipomoea* sp.), *Commelina*, and nutgrass. Further investigations have shown that these and many other weeds, including *Mimosa pudica*, are effectively controlled if 1 lb. of 2,4-D is added to a concentrate of the emulsion. Thus, the virtues of a general contact and a hormone herbicide are combined in one formula. Excellent results against such coarse and vigorous grasses as *Panicum purpurascens* and *Trichachne insularis* in non-tilled areas have been obtained with the following mixture: 2 lb. pentachlorophenol are dissolved in 1 gal. of a highly aromatic oil, and this is mixed in 100 gal. of diesel fuel, or any other oil of light enough viscosity. Applications must be made in sufficient quantity to cover the grass thoroughly.—Agricultural Research Station, Rio Piedras, Puerto Rico.

2924. VILLARIBA, C. A., AND CAPINPIN, J. M. 577.17
Morphogenetic effects of 2,4-dichlorophenoxyacetic acid on some crop plants [in the tropics].
Philipp. Agric., 1948, **31**: 163-76, bibl. 14, being *Contr. Exp. Stat.* **1473.**

A record of experiments on the morphogenetic changes brought about by 2,4-D in some Philippine crop plants and their possible bearing on crop improvement. The best concentrations of 2,4-D spray for inducing parthenocarpy and increased fruit set in the eggplant, as well as for reducing the time from flowering to fruit ripening, was 25 p.p.m. The same concentration was exceedingly potent in inducing parthenocarpy in the tomato and in increasing fruit set, but it produced deformation of foliage. With papaws 2,4-D (optimum conc. 25 p.p.m.) induced the production of "lowseeded" (parthenocarpic) fruits and shortened the time from blossoming to fruit ripening. The statistical significance of the results is shown.—Univ. of Philippines.

Sweet potato.

2925. LEONARD, O. A., AND ANDERSON, W. S. 633.492
Some problems in sampling the sweetpotato plant.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 299-302, being *Pap. Miss. agric. Exp. Stat.* **139** N.S.

A statistical study of the relationship between the mineral content of the leaf-blades and the other parts of the sweet potato plant.—State Coll., Mississippi.

2926. MIKELL, J. J., MILLER, J. C., AND EDMOND, J. B. 633.492
Flowering of the Jersey type sweet potato.
Science, 1948, **107**: 628, bibl. 5.

A report of flowering in Maryland Golden (Jersey type) and of the conditions under which flowering took place. Observations indicate that for flowering the vegetative stage requires conditions conducive to the development of numerous vines, while the reproductive stage needs conditions favourable to the accumulation of carbohydrates over a longer period than is necessary for flowering in other varieties.—Louisiana St. Univ., Baton Rouge.

2927. LEONARD, O. A., AND ANDERSON, W. S. 633.492: 581.144.2
Seasonal development of fibrous and storage roots of sweetpotatoes.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 303-10, bibl. 1, illus., being *J. Pap. Miss. Agric. Exp. Stat.* **143.**

The report of a study on root development in two sweet potato varieties growing in two soil types in Mississippi. The results tend to explain why sweet potatoes are usually more quickly susceptible to drought when growing on the lighter sandy loams than on the heavier soils, and suggests that luxuriant vine growth, associated with heavy applications of fertilizer, might actually be detrimental, especially in dry weather. With a limited supply of available soil moisture, large, rapidly transpiring plants would deplete the soil moisture faster than smaller plants. This behaviour may explain why a yield response in sweet potatoes due to fertilizer may be indicated at some time during the growing season, but may have disappeared by the time of the normal harvest period. [From authors' summary.]

2928. ARLE, H. F., LEONARD, O. A., AND HARRIS, V. C. 633.492-2.954
Inactivation of 2,4-D on sweet-potato slips with activated carbon.
Science, 1948, **107**: 247-8, bibl. 1, being *J. Pap. Miss. agric. Exp. Stat.* **148.**

Immediately before planting sweet potato slips, the soil was treated with the sodium salt of 2,4-D at concentrations of 1,000-4,000 p.p.m. One half of the plots was planted with sprouts, the roots of which were first moistened and then dusted with activated carbon (Norit A, about 1 lb./1,000 sprouts). On a sandy loam survival figures of treated plants and controls respectively were: at 1,000 p.p.m. (free acid equivalent per acre, 1·3 lb.), 78% and 5%; at 2,000 p.p.m., 70% and 1·7%; and at 3,000 p.p.m., 62·5% and 0%. The yields of treated roots were not affected except by the influence of 2,4-D on plant survival. The data indicate that activated carbon will protect certain crop plants against 2,4-D applied to the soil as a pre-emergence herbicide.

2929. Person, L. H., Olson, E. O., and Martin, W. J. 633.492-2.4
Effectiveness of fungicides in controlling black rot of sweet potatoes.
Phytopathology, 1948, **38**: 474-9, bibl. 3, illus.
In treating sweet potatoes against black rot (*Ceratostomella fimbriata*), after commercial washing, 17 compounds were tested. Promising results were given by borax (approx. 1%) and Dithane D-14.—Louisiana agricultural Experiment Station.

Sugar cane.

(*See also* 3088, 3117, 3142.)

2930. Caribbean Commission. 633.61(729)
The sugar industry of the Caribbean.
Crop Inquiry Series **6**, 1947, pp. 343, bibl. 803, 1 map.
Brief reviews are given of the sugar industry in each of the producing countries in the Caribbean from the standpoint of: history, acreage, production, yield per acre, rainfall, soil, sugarcane varieties, diseases and pests, mechanization in the field, organization of the industry, research, etc. The sugar industry, which still occupies first place in Caribbean economy, provides a study in contrasts. Great progress has been made in the fight against disease, the breeding of better varieties, and the use and application of fertilizers. Only limited progress is recorded in mechanical cultivation and the centralization of production. Appendices II to IV record the history, development and progress of sugar-cane breeding at the B.W.I. Sugar-cane Breeding Station, Barbados. Appendix V gives similar information on sugar technology research at the Imperial College of Tropical Agriculture, Trinidad. The bibliography of over 800 items is noteworthy.

2931. Rosenfeld, A. H. 633.61
Sugar cane planting experiments, 1933-1937.
Bull. tech. sci. Ser. bot. Sect. Minist. Agric., Egypt, **195**, 1939, pp. 29, bibl. 23, illus. [received 1948].
Accounts of experiments on date of planting, spacing, and planting material.

2932. Elliott, J. T. 633.61
Q.50 and Trojan in the Mackay district.
Cane Gr. quart. Bull., 1948, **12**: 1-3.
Includes notes on the origin, characteristics, and time of maturity of these two sugarcane varieties—the most recent additions to the approved lists for the Mackay mills, Queensland.

2933. Hughes, C. G. 633.61-2.97
The Bureau [Sugar cane] quarantine house.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 21-5, illus.
A description is given of the specially designed sugar-cane quarantine glasshouse maintained by the Bureau of Sugar Experiment Stations at Brisbane, Australia. A note is given on the procedure followed in introducing canes from abroad for commercial purposes and breeding. The variety C.P. 29/116, imported in 1935, has proved to be one of the most valuable introductions: in 1947 over 420,000 tons of it were harvested in Queensland.

2934. Halais, P. 633.61-1.8
Microdosages rapides de N, P, et K par colorimétrie photo-électrique utilisés à Maurice pour le diagnostic foliaire de la canne à sucre. **(Rapid microanalysis of N, P, and K by photo-electric colorimetry used in Mauritius for foliar diagnosis in sugar-cane.)**
Rev. agric. Maurice, 1948, **27**: 100-12, bibl. 8.
After an introductory note on the creation of a special laboratory at Curepipe, Mauritius, for foliar diagnosis, the author proceeds to describe the technique of leaf-punch sampling, the use of the diagnostic key, the method adapted for carrying out photo-electric micro-analysis and the calculation of results.

2935. Halais, P. 633.61-1.8
Foliar diagnosis: a comparative index of the mode of nutrition of sugarcane.
Rev. agric. Maurice, 1948, **27**: 122-5, bibl. 11.
A defence of the method of foliar diagnosis, criticized by O. W. Willcox. Proof is offered that the method as used for sugar-cane in Mauritius is "faithful, sensitive and practical".

2936. Lauritzen, J. I. 633.61: 581.19
Inversion of sucrose and other physiological changes in harvested sugarcane in Louisiana.
Tech. Bull. U.S. Dep. Agric. **939**, 1948, pp. 65, bibl. 23.
The data presented deal with the effects of maturity of cane on inversion, and with the effect of temperature, humidity, and loss of moisture on germination (rooting and sprouting), loss of solids, inversion of sucrose and other physiological changes in hand-harvested and hand-stripped cane of 6 varieties during storage. Of the varieties studied, Co.281 and Co.290 showed the greatest resistance to inversion of sucrose. C.P.28/19, C.P.28/11, C.P.807, and P.O.J.36-17 showed considerable susceptibility to inversion.

2937. Brett, P. G. C. 633.61: 581.162.3
A possible method for increasing pollen fertility of sugar cane in Natal.
S. Afr. J. Sci., 1948, **44**: 122-4, bibl. 2.
Experimental results indicated that the most successful method was that in which flowering canes were cut with "rather long" stalks and subjected to glasshouse conditions by day and moved towards evening to a heated room where length of day and relative humidity were artificially increased.

2938. Camuglia, J. 633.61-1.874
A machine for planting legumes.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 27-8, bibl. 1, illus.
After referring to the benefits derived from interplanting legumes in sugar-cane in the wet tropics, an illustrated description is given of a machine designed "to give a quick, uniform and economical distribution of legume seeds, either in growing cane or fallow". Drawn by a horse, this planter should cover 16 acres per day.

2939. McMartin, A., and King, N. C. 633.61-2.8
Some factors influencing the spread of sugar cane mosaic in Natal.
S. Afr. Sugar J., 1948, **32**: 291-3, 295, 297, 299, 301.
In Natal sugar cane mosaic appears to have no adverse effect on Co.281 and Co.301. The disease is more frequent inland, particularly near *Setaria sulcata*, a host plant, than near the coast. Interplanted maize allows the vector, *Aphis maidis*, to multiply and spread the disease more rapidly. Natural recovery may occur. Treatment of setts with hot water, or manuring with compost, had no effect on recovery in new fields.—Experiment Station, South African Sugar Association, Mount Edgecombe.

2940. Summers, E. M., Brandes, E. W., and Rands, R. D. 633.61-2.8
Mosaic of sugarcane in the United States, with special reference to strains of the virus.
Tech. Bull. U.S. Dep. Agric. **955**, 1948, pp. 124, bibl. 71, illus.
Sugarcane mosaic has a wide host range among both cultivated and wild grasses. Within the genus *Saccharum* the range is from complete susceptibility to apparent immunity. In other genera, mosaic has been observed on, or experimentally transferred to, 38 species of wild and 10 of

cultivated grasses. Two new hosts (*Erianthus giganteus* (Walt.) Muhl. and *Panicum reptans* L.) are reported. The proved vectors of sugarcane mosaic are *Aphis maidis* Fitch, *Hysteroneura setariae* (Thos.), and *Toxoptera graminum* (Rond.). The separation of seven strains and three substrains of the virus is demonstrated. They are identified largely by symptom expression on three differential host varieties. A key and chart are presented. Wide differences in symptom patterns occur on many varieties. A hypothesis to account for a succession of virus strains in Louisiana, based on varietal susceptibility and the results of this survey, is offered. Recovery from mosaic of certain sugarcane varieties is demonstrated. Extensive data are presented upon the different types of recovery with possible explanations and interpretations. The mosaic-resistance of the improved varieties now grown in Louisiana is such that mosaic has become only a minor problem in field practice. [From authors' summary.]

2941. King, N. J. 633.61-2.8
Fiji disease in the Maryborough district [Queensland].
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 165-9.
An historical record with notes on the variety changes brought about as a result of this major disease.

2942. Kreibohm de la Vega, G. A. 633.61-2.48
Medidas de precaucion contra la enfermedad de la caña llamada " Pokkah Boeng " a " mal de la escalera ". **(Precautions against Pokkah Boeng or ladder disease of sugar cane.)**
Circ. Estac. exp. Agric. Tucumán **140**, 1947, pp. 12.
Measures recommended include burning infected plants and suppressing susceptible varieties.

2943. Buzacott, J. H. 633.61-2.76
The field identification of cane grubs.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 29-34, bibl. 6, illus.
A method is given for identifying the various species of white grubs which attack sugar cane in Queensland. Photomicrographs of the anal paths of the grubs are used to illustrate the differences. There is a short note on the anal path of each species. [From author's summary.]—Bur. Sug. Exp. Stations, Gordonvale.

2944. Buzacott, J. H. 633.61-2.951
The use of benzene hexachloride in north Queensland canefields.
J. Aust. Inst. agric. Sci., 1948, **14**: 24-7, illus.
The white grub (*Dermolepida albohirtum* Waterh.) is easily the most important insect pest in North Queensland canefields. Sufficient knowledge has been gathered over the past two years to enable recommendations to be made for its control, i.e. the application of 100 lb. of 10% gammexane dust (1·3 lb. of γ isomer of benzene hexachloride) per acre. In some cases smaller doses are effective. Advice is given on methods of applying the dust.—Sugar Exp. Stat., Gordonvale, N. Queensland.

2945. Mungomery R. W. 633.61-2.76
The use of benzene hexachloride in controlling " white grubs " in Queensland canefields.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 35-42, bibl. 2, illus.
Benzene hexachloride was found to give adequate protection against grey-back grubs when used as a drill dressing at the rate of 100 lb. of 10% dust per acre applied before beetle flight. It has no apparent toxic effect on sugar cane when used at the minimum strength necessary for effective grub control. Benzene hexachloride has cheapened materially the cost of grub control in Queensland canefields, and its use is sure to increase. [From author's summary.]—Bur. Sug. Exp. Stations, Brisbane.

2946. Ingram, J. W., Bynum, E. K., and Charpentier, L. J. 633.61-2.78
Tests with new insecticides for control of the sugarcane borer.
J. econ. Ent., 1947, **40**: 779-81.
Ryania dust, 666 and a chlorinated camphene showed promise for controlling the sugarcane borer, *Diatraea saccharalis*. DDT, its methoxy analogue, sabadilla, and chlordane gave poor results. Replicated field tests were made at Houma, La, using cryolite as control.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2947. Wang, C. C. 633.61-2.7
Interrelationship between insect and disease in the sugar cane. [Chinese.]
Fukien agric. J., 1945, **7**: 2: 79-90.
Both cage experiments and field observations were made. The results of the cage experiments showed that red rot was common in all cases, sooty mould being restricted to the cages with woolly aphid, and mosaic being more prevalent in the woolly aphid cages than elsewhere. Red rot infection in the cages with moth-borer was directly proportional to the number of holes in the shoot. Void disease was found only in the woolly aphid lots and on one plant of the controls. The growth in length and diameter of the infested canes was always less than that of the controls. Field observations showed that of the plants infested with woolly aphid, 47·18% had void disease but of the controls only 10%. The green weight, sugar content, etc., of the diseased plants were less than that of the controls. Their juice was different chemically and contained more invert sugars. Most of the wilt tip and of the ineffective tillering was due to grubs, moth borer being responsible for some of the wilt tip.
H.C.Y.

2948. Nolla, J. A. B. 633.61-2.954
The control of grass weeds in sugar-cane fields in Puerto Rico.
Science, 1948, **108**: 112-3, bibl. 2.
The writer states that 2,4-D, which alone has little effect on grasses, becomes a very active grass herbicide when dissolved in diesel or aromatic oil and applied as a fine spray. The practical implications are obvious, seeing that grass weeds have become the most pernicious competitors of sugar cane where broad-leaved weeds have already been destroyed by 2,4-D and other herbicides. To obviate injury to sugar cane leaves two alternative methods of application have been developed. The first involves a preplanting application. Fields are prepared in the ordinary way, grass weeds are allowed to grow, and at the end of 3 weeks the 2,4-D oil-spray is applied. Cane is planted on the following day. This treatment will considerably reduce the grass growth while the young cane is growing. In the second method the 2,4-D oil-spray is applied to the growing cane when this is over 3 months of age. A combination of the two methods has been found to reduce effectively the number of hoeings from 6 or 7 to 3 in new plantings.

2949. Hance, F. E. 633.61-2.954
Weed control on Hawaiian sugar-cane lands—contact herbicides.
Hawaii. Plant. Rec., 1948, **52**: 93-112, bibl. 2.
Describes the progress made in Hawaii in herbicide research between 1944 and 1947. The older contact herbicides are gradually being replaced by less dangerous preparations. One of these is concentrated activated Diesel emulsion (CADE), the development of which is described.

2950. Hanson, N. S. 633.61-2.954
Weed control experiments and practices in sugar-cane production.
Hawaii. Plant. Rec., 1948, **52**: 113-54, illus.
A report on a visit to Hawaii. The report includes check lists of the weed species found in the four main islands, a note on fundamental studies on herbicides carried out

by the H.S.P.A. Exp. Stat., a brief progress report on special studies (see below), and a note, with tables, on the calibration of spraying equipment. The special studies were concerned with tests of a large number of chemicals (named) as herbicides against Bermuda grass, the major weed pest; rates of treatment; spray equipment; man-day performance; and aeroplane spray tests. Amongst the chemicals showing promise for the control of Bermuda grass were ammonium and sodium trichloroacetate.

2951. Steindl, D. R. L., and Pembroke, A. E. 633.61-2.5
The cane-killing weeds [*Striga* spp.].
Cane Gr. quart. Bull., 1948, **12**: 4-9, illus.
Some brief notes on the occurrence, world distribution, and symptoms of attack of this parasite. Three kinds of *Striga* (unidentified) are found in Queensland sugar plantations. Control measures are listed, including the use of 2,4-D herbicides. Single sprayings of these, at recommended strengths, completely killed *Striga* without affecting the sugar cane crop.

Tea.

(*See also* 3082, 3133.)

2952. van Roggen, M. A. 633.72
Eindresultaten van de plantwijdteproef op Pasir Junghuhn. **(Final results of the planting distance experiment at Pasir Junghuhn Estate.)** [English summary 1½ pp.]
Arch. Theecult. Ned.-Ind., 1948, **16**: 25-35, bibl. 3.
Over 12½ years the closest plantings of tea have given the highest cumulative yields. For intensive cultivation and quick returns the hedge system, with 12,000 to 14,000 stands per ha., is recommended. For normal estate planting a density of 5,000 to 9,000 plants per ha. is advisable: strongly branching clonal material may be planted at a lower density.

2953. Deys, W. B. 633.72: 581.1
Metingen van de intensiteit der ademhaling bij theeblad. **(Measurements of the respiration of tea leaves.)** [English summary 3 pp.]
Arch. Theecult. Ned.-Ind., 1948, **16**: 1-15, bibl. 6, being *Meded. Proefstat. West-Java.*
Quantitative experiments on the respiration of detached tea leaves are described. The effects on respiration of treatment with HCN, with chloroform, of heating, storage, withering and of bruising, are discussed. A respiration theory is put forward.

2954. Buckley, T. A. 633.72-1.56
The manufacture of tea.
Malay. agric. J., 1948, **31**: 123-6.
A review. Includes notes on some possible developments arising from recent research.

2955. Shaw, R. 633.72-1.56
Some modern methods of tea manufacture.
Malay. agric. J., 1948, **31**: 188-94, reprinted from *Chron. Natur.*, 1948, Vol. **104**, No. 3.
Two modern methods are described: (1) the use of leaf shredders for cutting fresh leaf and the consequent abolition of the usual withering process, (2) an adaptation of the Clivemear method of rolling. Both of these unorthodox methods, which will produce tea of excellent cup quality within 2 hours of the arrival of the green leaf at the factory, offer a solution to the problem caused by mounting costs of materials and labour. Other modern methods referred to are cone, or epicyclic, rolling and the adoption of central sorting and packing of the tea produced by estate groups.

2956. Jenkins, A. E., and Bitancourt, A. A. 633.72-2.4
Duas verrugoses do chá, causadas por "Elsinoë", e sua distribuição. **(Two scab diseases of tea, caused by *Elsinoe* spp., and their distribution.)** [English summary ½ p.]
Arq. Inst. biol., 1946, **17**: 67-72, bibl. 10, illus. [received 1948.]
Mottle scab of tea is caused by *Elsinoe theae*; it occurs in Ceylon, Punjab, Uganda, Tanganyika, Nyasaland and São Paulo. White scab, reported from Japan, appears to be distinct; a new species, *Elsinoe leucospila*, is described from white scab lesion on tea leaves from Guatemala.

2957. Manning, J. D. 633.72-2.654
An interim report on experiments for the control of helopeltis in tea.
Plant. Chron., 1948, **43**: 439-42.
This report indicates that *Helopeltis* on tea can be controlled by 3-4% DDT applied at 25 lb. per acre per round. Two applications were given, 10 days apart.

Coffee.

(*See also* 3053, 3072, 3094, 3095, 3156.)

2958. Kenya Coffee Board. 633.73
Report of the Proceedings of Coffee Conference 1948.
Mon. Bull. Coffee Bd Kenya, 1948, **13**: 99-111.
Includes a discussion of a proposal to initiate research into quality with a view to correlating the terms used in coffee liquoring reports with faults in growing and preparing coffee on the plantation.

2959. Chokkanna, N. G. 633.73
Review of the coffee quality scheme.
Publ. Indian Coffee Bd, Bangalore, 1947, pp. 16, 12 Annas/1 Sh.
An outline is given of investigations carried out under the Imperial Council of Agricultural Research (1939-42) and the Indian Coffee Board (1942-45). The following are among the results quoted in brief. Quality: general indications regarding manuring and cup quality seem to signify that, with a few exceptions, manuring does not influence cup quality to any great extent. Spraying and pruning seem to improve the raw appearance of the bean. Slow desiccation damages the quality of the bean. Underwater fermentation and draining of fermentation product improves quality. Fermentation, using the Honnametti strain of yeast, also improves quality. No significant difference in quality could be observed amongst the different varieties of *C. arabica* studied. There is no basis for the belief that coffee grown at higher elevations is of better quality. Yield: No correlation could be established between manures applied and yield of plots. Climate seems to play a very important part, which masks the effects due to manuring. Spraying increases yield. Observations on the growth of the bean from spike to flower to berry (blossom berry) have shown that climate plays a very important part in the number of berries that develop and survive to ripen. General: grading data indicate that spraying causes an increase in "A" grade beans and reduces triage. Laboratory data confirm the supposition that better coffees have higher specific gravity. The "A" grade bean has a higher fat content than "B" grade, which in turn has a higher fat content than "C".

2960. Thomas, K. M., and Narasimhaswamy, R. L. 633.73-1.53
Vegetative propagation of coffee.
Mon. Bull. Indian Coffee Bd, 1948, **12**: 4: 3-5.
A short note on work done in India and elsewhere, including an account of the successful grafting of *Coffea arabica* on stocks of *C. robusta*, *C. liberica* and Netraconda hybrids.

The wedge grafting of nursery seedlings and of stump suckers in the field is briefly described. Reference is made to the rooting of cuttings in propagators.

2961. Franco, C. M., and Inforzato, R. 633.73: 581.144.2
O sistema radicular do cafeeiro nos principais tipos de solo do estado de São Paulo. **(The root system of coffee in the principal soil types of the State of São Paulo.)** [English summary ½ p.]
Bragantia, 1946, **6**: 443-58, bibl. 9, illus. [received 1948].
The technique of excavation and observations resulting therefrom are detailed.

2962. Chokkanna, N. G. 633.73-1.8
Manurial experiments on coffee at the Coffee Research Station, Balehonnur.
Mon. Bull. Indian Coffee Bd, 1948, **12**: 5: 3-5.
A description of a latin square coffee manurial experiment and a record of yields over eight years from 1940. The results are not statistically significant.

2963. Pereira, H. C. 631.8: 633.73
Manures and fertilisers [for coffee].
Mon. Bull. Coffee Bd Kenya, 1948, **13**: 36-8.
An outline of the first season's results from long-term coffee manurial trials. It is concluded, tentatively, (i) that the coffee tree may need more nitrogen than a normal coffee soil supplies, even when the crop is not heavy, (ii) that phosphatic dressings do not lead to crop increases unless the soil is extremely deficient in phosphates—crop responses to maintenance dressings are therefore not to be expected.

2964. Mendes, J. E. T. 633.73-1.542
Ensaio de desbaste dos ramos inferiores do cafeeiro. **(Trial of pruning the lower branches of coffee.)** [English summary ½ p.]
Bragantia, 1946, **6**: 567-82, bibl. 1, illus. [received 1948].
Some growers in Brazil habitually remove the lower primary branches of coffee bushes. On plants of *Coffea arabica* var. *typica* this practice significantly depressed yield over a period of ten years.—Instituto Agronômico, Campinas.

2965. Thomas, K. M. 633.73-2.4 + 2.6/7
Short notes on some diseases and pests of coffee [in S. India].
Mon. Bull. Indian Coffee Bd, 1948, **12**: 6: 5-6.
Descriptions are given of the following, with some notes on control measures: *Hemileia vastatrix*, *Pellicularia koleroga*, die-back, Jelloo, *Xylotrechus quadripes*, *Xyleborus morstatti*, *Lecanium viride*, *Pseudococcus citri* and *Anguillulina pratensis*.

2966. Melville, A. R. 633.73-2.752
Mealybug: The present position [in Kenya].
Mon. Bull. Coffee Bd Kenya, 1948, **13**: 97-8.
The degree of biological control of the common coffee mealybug (*Pseudococcus kenyae*) exercised by the introduced parasite, *Anagyrus kivuensis*, varies with climatic and environmental conditions. Recommendations are made regarding the prevention of parasite failure and the steps to be taken in case of a mealybug outbreak.

2967. Sauer, H. F. G., Duval, G., and Falanghe, O. 633.73-2.76
Combate à broca do café (*Hypothenemus hampei*) e a possibilidade do emprêgo de inseticidas. **(The use of insecticides to control the coffee berry borer.)**
O Biológico, 1947, **13**: 205-14.
Laboratory and field trials show that DDT and 666 are promising insecticides for controlling the coffee berry borer. —Campinas, São Paulo.

2968. Seixas, C. A. 633.73-2.76
Contrôle químico da broca de café (*Hypothenemus hampei*). **(Chemical control of the coffee berry borer.)**
O Biológico, 1947, **13**: 215-28.
Tests showed that DDT or 666 may be used to control the coffee berry borer. Of the methods of application tried in the valley of the Rio Feio, where the coffee plantations are extensive, power dusting was the most satisfactory.

2969. Seixas, C. A. 633.73-2.76
A prática do combate químico á broca do café. **(Chemical control of the coffee berry borer in practice.)**
O Biológico, 1948, **14**: 71-89, illus.
A discussion of methods of applying insecticides against the coffee berry borer, based on trials carried out by, or in conjunction with, the Instituto Biológico, São Paulo. Although tests have been made with Rhodiatox (parathion), its use cannot yet be recommended. DDT is less effective than 666. The present recommendation is that 666 should be applied in a talc dust at a concentration of 1% of the gamma isomer; a mixing machine is described. The first application should be made between the early part of October and the first half of December, depending on locality, while the fruit is still green; the second, 12 to 20 days later, after heavy rain. The necessity for making a third application, 30 to 40 days after the second, can be judged by examining samples of dried fruits remaining after harvest and verifying the degree of infestation. On plantations of up to 30,000 bushes, manually operated dusters should be used; one of these can cover 500 bushes a day, or more if of the type for use while mounted. Small power dusters, drawn by animals or small tractors, can cover 4,000 bushes a day; the costs of this method are discussed. Trials of dusting from ordinary aircraft show that the best conditions occur before 9 a.m. and after 4 p.m.; in the 5 hours available it is possible to dust about 40,000 bushes daily, as satisfactorily as from the ground. The use of the helicopter is also limited to the early morning and late afternoon; in normal flight it is possible to dust 40,000 bushes per hour.

2970. Jones, P. A. 633.73-1.57
Coffee pulp as cattle feed.
Mon. Bull. Coffee Bd Kenya, 1948, **13**: 113.
A short note on experiments to be laid down to test drying and ensiling methods for preserving coffee pulp.—Dep. Agric., Kenya.

Cacao.

(*See also* 2342, 3074, 3128, 3129.)

2971. Cheesman, E. E. 633.74
Report on potentialities for the cultivation of cocoa in Malaya, Sarawak and North Borneo.
Colonial No. **230**, 1948, pp. 44, H.M. Stationery Office, Lond., 9d.
The following are amongst some of the main findings of this report. Malaya is far better situated to take up the crop than either Sarawak or North Borneo, but the areas of first-class land in Malaya thought suitable for cocoa are scattered and are not great in extent. An annual output of 100,000 tons should, however, be possible from Malaya once the crop became established, but no considerable output could be expected within the next decade—mainly because of the lack of suitable planting material. Before large-scale planting can be recommended there is much to be learnt about cocoa in Malaya. The immediate policy must be to combine experimentation with the bulking of planting material so as to prepare a sound foundation for development. Cocoa, if established in Malaya, will not interfere with the chief food crop, rice. It is also unlikely to replace rubber to any extent. Sarawak is unlikely to

contribute substantially to world cocoa supplies. North Borneo's potentialities for cocoa production fall somewhere between those of Malaya and Sarawak. All three countries mentioned would be handicapped by the shortage of planting material, particularly Sarawak and North Borneo. In a separate section of the report devoted to the supply of planting material it is concluded that a co-ordinated scheme for its introduction and bulking would offer the best solution, while at the same time minimizing the risk of introducing cocoa pests and diseases still happily unknown in the Far East. Brief reports on those diseases and insects associated with cocoa in Malaya are given in Appendix B.

2972. LLANO GOMEZ, E. 633.74
Cultivo del cacao. **(Cacao growing.)**
Publ. Minist. Econ. nac., Bogotá, 1947, pp. 150, bibl. 34, illus.

This book is a complete guide to cacao growing in Colombia, where the consumption of cacao now exceeds production. Land suitable for the fine cacaos is available, and in the national interest it should be exploited. The following topics are discussed at some length:—rehabilitation, sowing at stake and in the nursery, budding, rooting cuttings, incompatibility, pollination, pruning, pests and diseases, shade trees and their pests, and windbreaks. Some degree of overhead shade is generally essential; the amount depends on the spacing and growth habit of the cacao variety. Wide spacing (5 m.) is desirable to combat *Monilia* pod rot.

2973. FOWLER, R. L. 633.74
Cacao cultivation and improvement programs.
Foreign Agric. Rep. Wash. **26**, 1948, pp. 17.

A study covering: the historical background, crop botany, variety descriptions, climatic requirements, cultural practices, marketing problems, crop improvement programmes in the British Colonial Empire and the American Republics, and the outlook for the future.

2974. VOS, H. C. C. A. A. 633.74: 581.162.3
Germination of cacao pollen.
Chron. Natur., 1948, **104**: 4: 99-101, bibl. 4.

Cacao pollen from several Java hybrid trees showed satisfactory germination percentages when sown on 1½% agar with glucose; the best results were obtained in hanging-drop cultures with a glucose concentration of 4%. Care must be taken that the germinating pollen is amply provided with oxygen. Germination started after 2 hours; the tubes continued growing for several hours and eventually reached a considerable length. No evidence was obtained of male sterility or of defective pollen. The average diameter of the grains was about 0·022 mm. in 3% glucose solution with all trees examined. [Author's summary.]

2975. OSTENDORF, F. W. 633.74: 581.162.3
Fertility of cacao.
Chron. Naturae, 1948, **104**: 4: 101, bibl. 9.

It is concluded (1) that all cacao trees belong to one of two sharply distinguished classes, viz. the self-sterile and the self-fertile; (2) that pollinations are always compatible if at least one of the parents belongs to the self-fertile group; (3) that in both compatibility classes the trees vary considerably in their ability to set fruit and that these differences do not, or only slightly, depend on the pollen used but have their origin in physiological factors acting within the mother plant. The differences are partly permanent and partly subject to seasonal fluctuations. [From author's conclusions.]

2976. STAHEL, G. 633.74-1.535
De bladstekken-methode voor het vermenigvuldigen van cacao. **(The multiplication of cacao by leaf cuttings.)**
Bull. Dep. Landbproefstat. Suriname **61**, 1948, pp. 15, bibl. 7, illus.

An account of extensive multiplication of cacao by single node cuttings in modified I.C.T.A. propagators. *Material*—Young softwood shoots, firm but still green, are cut early in the morning. At the bins the base of the shoot is cut afresh and dipped for a second in indolebutyric acid (2 mg./c.c. 50% alcohol). Next the shoot is cut between the two lowermost leaves and the new base dipped as before; this process is repeated to give the separate cuttings. The uppermost leaf is discarded. *Rooting bins*—In the propagators the leaves are supported between wires. By a combination of fixed and movable screens the light is controlled to a maximum of about 10% of direct sunlight; less shade is used in dull weather. By shading, the temperature in the bins is held below 30° C. The leaves are sprayed frequently to maintain humidity. Roughly 75% of the cuttings root well enough to be transplanted into baskets after 4 weeks; the leaf is supported at this stage by a bamboo stick. *Hardening bins*—During the first 4 days the plants are sprayed 4 times a day; after a week the glass lids are raised an inch on alternate days and at the end of a fortnight the baskets are put out under shade (25% light) for 4-6 months, when they are ready for setting out in the field. Experiments involving CO_2, ethylene, heat, and ventilation, are described. The bins are to be fitted with internal spray lines to simplify moisture control.

2977. NEWHALL, A. G. 633.74-2.3/4 +2.8
Research at Turrialba on cacao diseases.
Cacao Inform. Bull., 1948, **1**: 7: 1-4.

A progress report of work on the determination, life cycle, and control of fungi causing cacao diseases in Costa Rica. The most important is *Phytophthora faberi* (*P. palmivora*), which causes *Phytophthora* pod rot. Various fungicides are being tested against this fungus. Pod rots caused by *Colletotrichum theobromicolum* and *Diplodia theobromae* have also been found. Various fungi have been isolated from lesions on cacao seedlings, at or below soil level. No infection has been observed on seedlings of *Theobroma simiarum* inoculated with *Phytophthora faberi*. Crosses of *Theobroma simiarum* × *Theobroma cacao* have been made, and some pods have set.

Rubber.

(*See also* 3150, 3151.)

2978. OSTENDORF, F. W. 633.912-1.541.44
Twee proeven met meervoudige Hevea-oculaties. **(Two experiments with double-budded Hevea trees.)** [English summary 3 pp.]
Arch. Rubbercult. Ned.-Ind., 1948, **26**: 1-18, bibl. 7, being *Meded. Proefstat. West-Java.*

First experiment—Plants of each of the clones AV36, Ct88 and BR2, budded on unselected seedlings of *Hevea brasiliensis*, were budded again at a height of 80 or 160 cm., using buds of the same clone or one of the other two. Yield records over 16 months, tapping the intermediate stem, showed that the three clones have about the same yield capacity for trees of equal girth; and that the top clone, as might be expected, does not influence the productivity of the intermediate. *Second experiment*—Illegitimate seedlings of *H. brasiliensis* were budded with AV36, AV50 and Ct88, and one clone of each of the following: *Hevea spruceana*, *H. guianensis*, *H. collina* and *H. confusa*. The *brasiliensis* plants were budded again at 1 m. with a bud either of the same clone or of one of the other species; some plants of the other species were similarly budded with material of one of the *brasiliensis* clones; others were not budded again. In general the nature of the upper component considerably affected the rate of growth and yield capacity of the intermediate section of the tree.

2979. MAAS, J. G. J. A. 633.912-1.521
De selectie van Hevea in de praktijk. **(Selection of Hevea and its effect upon the yield of estate plantations.)** [English summary 7 pp.]
Arch. Rubbercult. Ned.-Ind., 1948, **26**: 19-114, bibl. 32.

The writer traces the development and introduction of improved planting material of rubber, and outlines the effect of selection and breeding on the output of a particular company and on the average productive capacity of rubber areas in general. Roughly half the rubber areas in Java and Sumatra are now planted with good selected material; this includes bud-grafted clones and selected clonal seedlings which may be of equal value. Seed selection has already trebled productive capacity; vegetative selection is likely to raise it further.

2980. Rubber Research Institute of Malaya. 633.912
Clones of the R.R.I. " 500 " series.
Circ. Rubb. Res. Inst. Malaya **28**, 1948, pp. 7.
On the basis of experiments carried out to date clones 501 and 512 are recommended for large-scale planting. Clone 509, also a very high yielder, " might be planted on a small scale on estates where root anchorage is good ".

2981. R[hodes], E. 633.912-1.531
Clonal [rubber] seeds.
Quart. Circ., Rubb. Res. Scheme, Ceylon, 1947, **24**: 3/4: 27-33.
A list of approved sources of clonal seed produced in Ceylon, Malaya, Java, Sumatra and S. Travancore.

2982. Mendes, L. O. T. 633.912-2.19
O superbrotamento da seringueira *Hevea brasiliensis* Muell. Arg. **(Multiple sprouting of hevea.)** [English summary 1 p.]
Bol. técn. Inst. agron. Norte Belém **5**, 1946, pp. 12 [received 1948].
A description of a disorder of young seedling and budded hevea plants, in which the leaves were deformed and axillary and secondary buds developed. Unsuccessful attempts were made to transmit the disorder to normal plants. A few months after this condition had been observed, all affected plants recovered.

2983. Siddiqui, R. H. 633.913
***Cryptostegia grandiflora* R. Br., A war time source of vegetable rubber. VI. Yield of latex and rubber.**
Indian J. agric. Sci., 1946, **16**: 399-404, bibl. 14, illus. [received 1948].
Mainly concerned with tapping, which is done by decapitating tender shoots which are then thrust into bamboo, or glass, tubes where the latex collects. Experiments are reported on: best time of day for tapping, effect of tapping on shoot growth, effect of frequency of tapping, and seasonal variations affecting latex yield. (See *H.A.*, 17: 993.)

2984. Stewart, W. S., Bonner, J., and Hummer, R. W. 633.913
Yield, composition, and other latex characteristics of *Cryptostegia grandiflora*.
J. agric. Res., 1948, **76**: 105-27, bibl. 19.
Latex flow from whips of *Cryptostegia grandiflora* is influenced by relative humidity, wind and temperature, the effects of which are interrelated. As it flows from a cut whip the latex becomes progressively more dilute. Of the total movement of latex in the first minute after a bleeding cut is made, 90% or more takes place within 40 inches of the cut. Successive whip bleedings decrease both the yield of latex and the percentage of rubber in the latex. Higher yield of rubber is obtained by both bleeding and extracting a whip than by either process alone. Latex can be coagulated by mechanical agitation. Whip latex obtained in the morning has a higher percentage of rubber and a lower percentage of insolubles than that obtained in the afternoon. The latex solids from roots of mature plants contain as much as 30·7% rubber. The rootstock does not influence the composition of the latex of the scion.

Coconut.

(*See also* 3124.)

2985. Child, R., and Nathanael, W. R. N. 634.61-1.57
Copra from rejected coconut seedlings.
Chem. Agric. Notes, Coconut Res. Scheme **5**, *Trop. Agriculturist*, 1947, **103**: 90-1, bibl. 4.
In stringent nursery selection about 50% of the sprouting seedlings may be rejected. These discards need not represent a complete loss since they will yield No. 2 and 3 grade copra, rich in oil. The analyses of two samples of such copra is given, together with figures showing cost of curing and return per 1,000 discards.

2986. Child, R., and Nathanael, W. R. N. 634.61-1.57
Utilisation of coconut water.
Trop. Agriculturist, 1947, **103**: 85-9, bibl. 16.
A note, based on many analyses, on the possible utilization of waste coconut water. Average analytical figures are recorded. From these it is concluded that the material is not a possible economic source of sugar. From a preliminary study of the spontaneous fermentation of coconut water, it is concluded that it is not a promising source of alcohol. Reference is made to the use of the stale acetified water as an emergency rubber coagulant. The useful disposal of coconut water from copra curing on estates, and in desiccated coconut factories, is discussed. Fresh sterile coconut water has been used as a laboratory culture medium. [From authors' summary.]—Coconut Research Scheme, Ceylon.

2987. Frappa, C. 634.61-1.4
Remarques sur quelques sols de cocoteraies établies en polder sur le littoral nord-ouest de Madagascar. **(Observations on the soils of coconut plantations established on polder land on the north-west coast of Madagascar.)**
Oléagineux, 1948, **3**: 390-7, bibl. 11.
Analyses of 5 soils are given in which coconuts have been growing for periods ranging from 30 years to a few months. The importance of manuring for the maintenance of soil fertility is emphasized.

Oil palm.

2988. Varon, H. 633.85+634.58
La culture des plantes oléagineuses dans l'économie du continent africain. **(The cultivation of oil plants in the economy of the African continent.)**
Oléagineux, 1948, **3**: 373-8, bibl. 12.
The merits and demerits of large-scale groundnut production are considered in comparison with those associated with oil palm cultivation. The short-term advantage of early yields from groundnuts may be outweighed by the detrimental effect this crop has on the soil. The planting of large areas to oil palm, on the other hand, excludes a quick reaction to changes in economic conditions. It is anticipated that palm culture would have a similar effect on African social structure to that of coffee and cacao culture.

2989. Kovachich, W. G. 633.85-2.48
A preliminary anatomical note on vascular wilt disease of the oil palm (*Elaeis guineensis*).
Ann. Bot. Lond., 1948, **12**: 327-9, bibl. 4, illus.
In specimens of vascular wilt disease of the oil palm collected in the Belgian Congo and in sections from wilted palms received from Nigeria, fungal hyphae were consistently observed within the vessels. Hyphae were not observed outside the vascular bundles. No identification of the fungus within the tissues has been possible, but the presence of chlamydospores, and of conidia resembling the microconidia of *Fusarium oxysporum*, support the view that this fungus is the pathogen. [Author's summary.]

2990. MOREAU, C. 633.85-2.4
Un *Cercospora* parasite des feuilles du palmier à huile au Moyen Congo. (**A *Cercospora* parasitic on oil palm leaves in the Middle Congo.**)
Rev. Mycol., Paris, Suppl. colon. **12,** 1 May, 1947, p. 37, from abstract in *Bull. agric. Congo belge*, 1948, **39**: 500.
The large dry spots caused by this fungus on oil palm leaflets are greenish brown, particularly on the lower surface. The fructifications are of two types, one of which resembles *Cercospora palmicola*. [The effect of the fungus on the health and yield of the oil palm is not stated.]

Fibres.

(*See also* 2820, 2821.)

2991. SIRCAR, J. K. 633.5
Memorandum on fibres other than cotton and jute.
Misc. Bull. Indian Coun. agric. Res. **66,** 1948, pp. 59, bibl. 71.
The memorandum is written mainly from the standpoint of development, only those fibre plants of possible economic importance being dealt with. Among these are: *Agave sisalana, A. cantala, A. veracruz; A. wightii, Sansevieria* spp., *Furcraea* spp., *Musa textilis, M. sapientum* and *Boehmeria nivea*. It is concluded that among the most important fibres which should be developed in India immediately are: *Agave sisalana, A. veracruz, Sansevieria* spp. and *Boehmeria nivea*. Recommendations are made for their development.

2992. KOCH, P. 633.52
The bag problem. A summary of the possibilities of fibre production in the Union [of S. Africa].
Fmg S. Afr., 1948, **23**: 461-71, illus.
Includes notes on the characteristics and possibilities of: *Agave sisalana, Furcraea gigantea, Sansevieria* spp., *Phormium tenax, Boehmeria nivea, Hibiscus* spp.

2993. MEDINA, J. C., AND CORREIA, F. A. 633.526.23
A severidade de corte no sisal e análise tecnológica da fibra. (**The effect of the severity of cutting sisal on fibre quality.**) [English summary ¼ p.]
Bragantia, 1947, **7**: 207-19, bibl. 8 [received 1948].
Neither the physical nor the chemical characteristics of the fibres of the young, erect leaves differed appreciably from those of older leaves as usually harvested. The effect of cutting all leaves on subsequent leaf production is being investigated.

2994. MEDINA, J. C. 633.526.23
A influência do espaçamento sôbre o ciclo vegetativo do sisal. (**The effect of spacing on the vegetative phase of sisal.**) [English summary 14 ll.]
Bragantia, 1946, **6**: 111-7, bibl. 7 [received 1948].
In statistical spacing trials at the Ribeirão Preto and Pindorama Experimental Stations closely spaced sisal plants showed less tendency to pole early than did widely spaced plants. At Ribeirão Preto, plants that poled early had the fastest rate of leaf production.

2995. ESPINO, R. C., AND OCFEMIA, G. O. 633.526.1-2.8
An additional insect vector of bunchy-top of abacá, or manila hemp plant.
Philipp. Agric., 1948, **31**: 231-2, bibl. 1, illus., being *Contr. Exp. Stat.* **1482.**
The vector was the aphid *Pentalonia caladii* growing on varieties of *Caladium bicolor*.—Univ. of Philippines.

Fruits.

2996. MADRAS DEPARTMENT OF AGRICULTURE. 634(548)
Souvenir: Provincial Fruit Show, Madras, May 1948, pp. 44, illus.
Includes short articles on: the South India fruit industry, fruit policy in the Indian Union, fruit growing in the Hills of South India, citrus culture, canning and its development, fruit diseases and pests, the banana, the papaya, fruit research in Madras, the fruit preserving industry in S. India.

2997. HERKLOTS, G. A. C. 634.1/7(51)
Notes on ten fruit trees [in Hong Kong].
Food and Flowers, Hong Kong, 1948, No. 1, 38-58, illus.
Short descriptions, many of them illustrated, are given of the following: *Carica papaya, Musa cavendishii, M. paradisiaca s.s. sapientum, Artocarpus heterophyllus, A. hypargyrea, Achras zapota, Psidium guajava, P. cattleianum, Eugenia jambos, E. malaccensis, E. uniflora* and *Eriobotrya japonica*.

2998. MUZIK, T. J. 634.39: 577.17: 631.535
Effect of hormone on root formation in *Artocarpus communis*.
Science, 1948, **107**: 225.
Branch cuttings of the tropical breadfruit were found to root well (80% success), when dipped in a 1% indolebutyric acid solution. The cuttings were 12-15 in. long with 3-4 nodes and about ⅜ in. in diameter. They were planted in sand immediately after treatment and covered with banana leaves for 3 days. Light shade was provided. The experiments were carried out in Liberia, West Africa.

2999. ANON. 634.421
The guava.
Foreign Agric., 1948, **12**: 183, illus.
A brief note on its origin, distribution in U.S.A., appearance, fruit, and some uses. The fruit is exceptionally rich in vitamin C and also contains vitamins A and B.

3000. PATEL, M. K., MONIZ, L., AND KULKARNI, Y. S. 634.441-2.3
A new bacterial disease of *Mangifera indica* L.
Curr. Sci., 1948, **17**: 189-90, bibl. 1.
A description is given of a pathogen similar to one described from S. Africa by Doidge, but differing from it in several characters. The name *Pseudomonas mangiferae-indicae*, sp. nov., is given to it.

3001. BITANCOURT, A. A., AND JENKINS, A. E. 634.441-2.4
A verrugose da mangueira. (**Mango scab.**) [English summary 1⅓ pp.]
Arq. Inst. biol., 1946, **17**: 205-27, bibl. 9, illus. [received 1948].
Mango scab is described from infected leaves from Cuba, Florida, Puerto Rico and the Canal Zone; a similar disease has been observed in Brazil. Scab lesions are circular or slightly angular, brown or black at first and olive buff when conidiophores develop; leaf fall may occur. The fungus concerned has been named *Sphaceloma mangiferae*, and the perfect stage *Elsinoë mangiferae*.

3002. FENNELL, J. L. 634.74
"Cocona"—a desirable new fruit.
Foreign Agric., 1948, **12**: 181-2, bibl. 1, illus.
A popular description of *Solanum hyporhodium*, a tropical Amazon plant of coarse, sprawling, shrub-like growth, 4 to 5 ft. high, with ovoid fruits (illus.) 1 to 4 in. in diameter which vary in colour from yellow to deep purple. The flesh and inner pulp of the fruit is pale cream in colour. The plant is very productive and matures its crop about

7 months after planting. Ripening may be spread over several months. The fruit, which exhibits much variation within the species, is recommended for making preserves, pies and sauces, but not for eating raw. The possibility of improving the plant by selection or crossing with other species, such as *S. quitoense* (naranjilla or lulu), *S. hirsutissimum* (lulita), *S. hirtum* and others, is mentioned. A comparison is made of some important characteristics of cocona, lulita, and naranjilla regarded from the plant breeder's standpoint.

3003. MacDaniels, L. H. 634.771
A study of the Fe'i banana and its distribution with reference to Polynesian migrations.
Bull. Bernice P. Bishop Museum **190**, 1947, pp. 56+10 plates, bibl. 46.
Thirteen varieties and forms of the Fe'i banana collected in Tahiti, Fiji, Tonga, Samoa and the Hawaiian Islands are described and illustrated. These fall into two natural groups, (1) the type as described by Rumphius and (2) the one designated *acutaebracteata*. The conclusions reached from field and other studies are discussed at length.—Honolulu.

3004. Trim, L. G. 634.771-2.111
Prevention of frost damage in Lady Finger bananas.
Qd agric. J., 1948, **66**: 155-7.
The Lady Finger banana is mostly grown on alluvial flats, many of which are subject to frost damage. Sometimes frost is so severe that all bunches and mature plants are lost and normal sucker growth does not start again until well into the following summer. A method which prevented such damage is described. All bunches round the edges were covered with brown paper bags. Then seven oblong heaps of sawdust were built, each containing four sacks, or sufficient to smoulder for 3 days. Four of these were spaced equidistantly outside the first row on the north-western boundary of the plantation, and the other three between the ninth and tenth rows. In addition, twenty-four 2 lb. tins were distributed equally in the third, ninth and fifteenth rows and filled with a mixture of equal parts of coal tar and distillate fuel oil. These precautions were taken in early June, when the sawdust piles were lighted, and continued until the middle of August. Each morning an alarm was set for 4 a.m., when the grower made his forecast. If he considered that a frost was likely the tins of fuel (sufficient for 2 hours) were lit.

3005. Magee, C. J. 634.771-2.48
Transmission of bunchy top to banana varieties.
J. Aust. Inst. agric. Sci., 1948, **14**: 18-24, bibl. 7, illus.
An account is given of investigations initiated with the object of selecting a commercial banana resistant to bunchy top disease and suitable for Australian conditions. The results of inoculation tests indicate that the chances of achieving this object are small.—Dep. Agric., Sydney, N.S.W.

3006. Smith, W. A. 634.771-2.753
Control of the banana aphid [*Pentalonia nigronervosa*].
Qd agric. J., 1948, **66**: 351-2.
The banana aphid is only of significance in Queensland as a vector of bunchy top disease. Dusts of 666, DDT+666, and nicotine, and a spray of HETP failed to control the aphids, which may shelter under the leaf stalks. It is recommended that stools infected with bunchy top be destroyed by pouring kerosene into and around the funnel leaf. If properly executed, this treatment kills the aphids present and makes the plant unattractive to others.

3007. van Overbeek, J., and Cruzado, H. J. 634.774: 581.143.1
Note on flower formation in the pineapple induced by low night temperatures.
Plant Physiol., 1948, **23**: 282-5, bibl. 7, illus.
Unseasonable flower formation was induced in pineapples of the Red Spanish variety by lowering the minimum night temperature during late summer (about 72° F.) to that approaching minimal winter temperatures (about 62° F.). The idea is presented that the path by which low temperatures cause flower formation in the pineapple is via the organic acid and auxin metabolisms. [From authors' summary.]—Mayagüez, Puerto Rico.

3008. McKnight, T. 634.774
Water blister disease of pineapples.
Qd agric. J., 1948, **66**: 160.
Many growers do not yet realize that infection of pineapples with the water blister fungus results mainly from spores coming from nearby dumps of infective material and from the floor of the packing shed. Experiments have shown that careful attention to hygiene in the packing shed is sufficient to prevent losses from this disease.

3009. Heinrich, W. O. 634.774-2.78
Resinose do fruto do abacaxi. **(Gumming of pineapple fruit.)**
O Biológico, 1947, **13**: 119-22, illus.
The larvae of the moth *Thecla basilides*, tunnelling in pineapples, stimulate the formation of gum. Infested fruit are frequently destroyed by secondary pests or fungi. *Control*—Volunteer plants in abandoned pineapple fields should be destroyed. If this is not possible, livestock should be turned in whenever young fruits develop. No fruit should be allowed to remain in productive fields during June and July. When the plants begin to flower, inflorescences and fruits should be sprayed with lead arsenate 400 g., linseed oil 500 g., milk 2 l., water 100 l.

Other crops.

3010. Rowaan, P. A. 633.82/84(910)
De specerijen van Nederlandsch-Indië. **(The spices of the Netherlands East Indies.)**
Meded. kolon. Inst. Amst. **58**, 1942, pp. 85, bibl. in text, illus. [received 1948].
The cultivation, preparation and marketing of the following spices are described:—peppers and capsicums, nutmeg, cinnamon, cloves, vanilla, cardamoms, ginger and turmeric.

3011. St. Vincent. 633.681
Annual Report of Agricultural Department, St. Vincent, for 1946, 1947, pp. 29.
Arrowroot: brief notes are included in this report on selection work, a manurial trial with two varieties, and growth studies above and below ground.

3012. Larochas, L. 633.85
Le pourghère. **(Physic-nut.)**
Oléagineux, 1948, **3**: 321-8, illus., bibl. 4.
A brief botanical description of the physic nut, *Jatropha curcas*, is followed by notes on the plant's soil, climatic and cultural requirements, and its uses. Its non-edible oil is used in soap-making and has possibilities for use in paints and varnishes, and as a fuel. Two varieties of the plant are known. A plea is made for the selection of better types. The chief producers are the Cape Verde Islands where yields are reported to be 350-1,050 lb. of kernels per acre. Tables give the seed characters of different samples and some physical and chemical constants of the oil. The percentage of oil in the whole seed is 30-37 and in the kernel 48-59. The plant, propagated from seeds or cuttings, will reach full bearing in 1 to 2 years, and may live for 50 years.

3013. DAVID, P. A. 633.88
Heterosis in datura crosses.
Philipp. Agric., 1948, **31**: 177-84, being *Contr. Exp. Stat.* **1474.**
Refers to the heterosis observed in F_1 plants from crosses between two horticultural races (*fastuosa* and *alba*) of *Datura metel.*—Univ. of Philippines.

3014. LOUSTALOT, A. J., AND WINTERS, H. F. 633.88.51-1.8
The effect of three factorial levels of nitrogen and phosphorus on the growth and composition of *Cinchona ledgeriana.*
Plant Physiol., 1948, **23**: 343-50, bibl. 11, illus.
Seedlings of *Cinchona ledgeriana* were grown in sand culture for 5 months; the nutrient solution was applied with all combinations of 3, 18, and 81 p.p.m. of N, and 0, 5, and 25 p.p.m. of P. Low N, particularly in combination with high P, depressed growth; for optimum growth the nutrient balance is important. N increased the quinine and total alkaloid content of the plants; P was without consistent effect on it.—Mayagüez, Puerto Rico.

3015. HERKLOTS, G. A. C. 635.1/7(51)
Vegetable trials [in Hong Kong].
Food and Flowers, Hong Kong, 1948, No. 1, pp. 59-66; No. 2, pp. 21-9.
A short account of trials in the New Territories with many imported varieties of cabbage, cauliflower and lettuce grown during the winters of 1946-47 and 1947-48. The results of two seasons' trials at Sheung Shui with tomatoes, onions, celery, sweet pepper, sweet corn, and Swiss chard are reported and discussed.

3016. CARIBBEAN COMMISSION. 635.1+635.65
Root crops and legumes in the Caribbean.
Crop Enquiry Series **4**, 1947, pp. 128, bibl. 42, 1 map.
A brief review is given of root crops and legume production in each Caribbean country, the subject being dealt with under the following heads: varieties grown, methods of propagation, organization of seed supply, production organization, ecological considerations, problems of cultivation, diseases, pests, relation of production to local requirements, processing methods, acreage, numbers engaged in production, marketing, research, wartime developments, etc. The research work of the Imperial College of Tropical Agriculture, Trinidad, and of the Agricultural Experiment Stations at Rio Piedras and Mayagüez, Puerto Rico, is described. Three outstanding facts emerge from the data presented for the several countries: (1) the unorganized nature of production, (2) "the virtual indifference with which the cultivation of root crops and legumes is regarded", (3) the primitive nature of the limited processing facilities available. [See: Vegetables in the Caribbean, *Crop Enquiry Series* 5, and *H.A.*, 18: 2173.]

3017. FENNELL, J. L. 635.624
La calabaza tropical da un paso de avance. **(The tropical pumpkin takes a step forward.)**
La Hacienda, June, 1948, being *Publ. techn. Inst. interamer. Cienc. agric. Turrialba* **22**, pp. 2.
An interim account of the breeding programme, designed to produce a better pumpkin for cultivation in the tropics.

Noted.

3018.

a ANON. 633.72: 631.562
The elimination of foreign matter in tea.
Memo. Tocklai Exp. Stat. **3**, 1948, revised.

b ARRUDA, S. C. 633.61-2.3
A "escaldadura das fôlhas", doença da cana de açucar, nova no Brasil. **(Leaf scald, a [bacterial] disease of sugar cane new to Brazil.)** [English summary 1½ pp.]
Arq. Inst. biol., 1944, **15**: 141-95, bibl. 36, illus. [received 1948].

c CHEESMAN, E. E. 634.771
Classification of the bananas.* III. Critical notes on species. a. *M. balbisiana* Colla, b. *M. acuminata* Colla.
Kew Bull., 1948, No. 1, pp. 11-17, 17-28, bibl. in text, illus.

d CROSS, W. E. 633.61-1.535
La rapida multiplicacion de caña de las nuevas variedades. **(Rapid reproduction of new sugar cane varieties.)**
Circ. Estac. exp. Agric. Tucumán **134**, 1946, pp. 2. [received 1948].

e DUFRENOY, J., AND PRATT, R. 633.61
Histo-physiological localization of the site of reducing activity in stalks of sugar cane.
Amer. J. Bot., 1948, **35**: 333-4, bibl. 19.
By means of triphenyl tetrazolium chloride.

f ELA, G. A. 633.61: 631.521.3
Variety-tests on some introduced sugar cane varieties.
Bull. tech. sci. Ser. Minist. Agric. Egypt, **219**, 1940, pp. 14, bibl. 6 [received 1948].

g KLINKOWSKI, M. 633.72
Das Kulturareal des Teestrauches. **(The geographical distribution of tea cultivation.)**
Züchter, 1946, **17-18**: 80-9, bibl. 18 [received 1948].

h KREIBOHM DE LA VEGA, G. A. 633.61-2.4
Situacion actual de las variedades de caña de azucar con relacion a la plaga del "carbon". **(Susceptibility to smut of sugar cane varieties.)**
Bol. Estac. exp. Agric. Tucumán **61**, 1947, pp. 40.

i KRUG, C. A., AND CARVALHO, A. 633.73
Génetica de coffea. XI. A influência do gen recessivo *na* sôbre a produtividade do cafeeiro (*Coffea arabica* L.). **(The genetics of coffee. XI. The influence of the recessive gene *na* on the fruitfulness of arabica coffee.)** [English summary ½ p.]
Bragantia, 1946, **6**: 547-57, bibl. 9 [received 1948].

j PADWICK, G. W. 632.3/8: 633.491+633.61
Plant protection and the food crops of India. Part II. Plant pests and diseases of potatoes and sugar-cane; organization, machinery, and equipment for plant protection.
Emp. J. exp. Agric., 1948, **16**: 65-75, bibl. 30.

k ROSENFELD, A. H. 633.61: 631.543.1
The spacing of sugar cane in Egypt—and elsewhere.
Bull. tech. sci. Ser. Minist. Agric. Egypt, **164**, 1936, pp. 47, bibl. 120, illus. [received 1948].

* Parts I and II see *ibid.*, 1947, No. 2. pp. 97-106, 106-17: *H.A.* 18: 2230.

l ROSENFELD, A. H. 633.61: 631.84
Manurial requirements of sugar cane in Egypt. V. Time and number of nitrogenous fertilizer applications.
Bull. tech. sci. Ser. Minist. Agric. Egypt, **213**, 1939, pp. 16, bibl. 36, illus. [received 1948].

m RUBBER RESEARCH INSTITUTE, MALAYA. 633.912
1. Useful general information.
2. Standardisation and coagulation of latex.
3. Some estate chemicals and their uses.
4 and 5. Defects in smoked sheet.
6. Manufacture of pale crepe.
7 and 8. Preservation and testing of latex.
Cards Nos. 1 to 8, Chem. Div., Rubber Res. Inst. Malaya, revised April, 1948.

n SCHMITZ, G. 633.73-2.78
La pyrale du caféier robusta *Dichocrocis crocodora* Meyrick. **(The pyralid leaf roller of robusta coffee.)**
Bull. agric. Congo belge, 1948, **39**: 571-80, bibl. 3, illus.
Biology and control.

o STEVENSON, G. C. 633.61(881)
Sugar-cane varieties in British Guiana: an historical review.
Emp. J. exp. Agric., 1948, **16**: 143-54, bibl. 6.

p TOXOPEUS, H. J. 633.513: 631.963
On the origin of the kapok tree, *Ceiba pentandra*. [English summary 26 ll.]
Meded. alg. Proefst. Landb. Buitenzorg **56**, 1948, pp. 19, bibl. 15.

q VRYDAGH, J. M. 633.73-2.76
Les principaux insectes foreurs des tiges de caféiers. **(The principal coffee stem borers.)**
Bull. Compt. Vente Cafés Congo No. 12, from abstract in *Bull. agric. Congo belge*, 1948, **39**: 473-4.
Bixadus sierricola, *Herpetophygas fasciatus*, *Apate monachus*, and *Xyleborus sexspinosus*.

r WHITMORE, H. B. 633.74
World cacao-bean production and trade.
Foreign Agric. Rep. Wash. **29**, 1948, pp. 27, bibl. 10.

STORAGE.

(*See also* 3057, 3136.)

3019. BROT, R. 664.85
Peut-on améliorer l'état hygrométrique d'une cave à fruits trop sèche. **(Increasing the humidity of a fruit store that is too dry.)**
Rev. hort. suisse, 1948, **21**: 246-9, illus.
In a half-buried concrete fruit store the humidity rarely exceeded 78%, considerably below the optimum for satisfactory storage. It was modified by covering the bottom with clay to impede drainage, and adding a trough of moss sprayed to keep it moist. The mean humidity was thus increased to 88%.

3020. NYHLÉN, Å. 664.85
Isolering av lagerrum. **(The insulation of fruit storage rooms.)**
Fruktodlaren, 1948, No. 2, pp. 52-3.
In fruit stores the soil is an often neglected source of undesirable heat in autumn. A table indicating the soil temperatures at Nyckelby, Sweden, during September-November, 1942-1947, shows that the mean temperatures in the first half of November at a depth of 0·5 and 1 m. are 5·9 and 8·0° C. respectively. On a visit to the Norwegian research station Njøs, near Hermansverk, the author saw a fruit store insulated with a 25-30 cm. layer of sawdust between the walls, instead of the customary 8-10 cm. layer of cork. The store was built in 1935, and no disadvantage of the insulating material has yet been discovered.

3021. CHRISTOPHER, S. P., AND OTHERS. 664.84.11.037
Transpiration of apples in cold storage.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 114-8, bibl. 4.
Indications are given as to why rate of transpiration differs in a blower-cooled from that in a vacuum plate cooled store.

3022. FIDLER, J. C. 664.85.11.037: 632.19
Prevention of apple scald.
Fruitgrower, 1948, **106**: 40.
Severe scald occurred on King Edward VII apples in a gas storage trial on a semi-commercial scale in 1947-48. To a large extent it was controlled by oiled wrappers. With unwrapped fruit, control was less effective when ethylene and the odorous volatiles were removed by a filter; scald was unchecked when only the odorous volatiles were removed, without altering the concentration of ethylene.—D.S.I.R., Ditton Laboratory, East Malling.

3023. GHILLINI, C. A. 634.11-2.4: 664.85.11
Sulle cause di una dannosa alterazione delle mele. **(A serious affection of clamped apples.)** [English summary 4 ll.]
Riv. Fruttic., 1948, **10**: 81-7, bibl. 4.
In the neighbourhood of Ravenna a severe infection occurred among clamped apples. The symptoms were brown, spreading spots on the outside, gradually increasing and allowing the entry of other organisms. The fungus responsible was found to be *Peyronellaea veronensis* Goid. The advice given is that, when it is necessary so to clamp apples, aeration should be provided as in potato clamps by the inclusion of bundles of loose material set vertically and horizontally in the clamp. Moreover, the intermittent watering of the top layers of apples so clamped before marketing, to induce a high colour, is obviously conducive to infection.—Inst. Pat. Bologna.

3024. LIN, K-H. 664.85.11: 632.4
Enzyme and toxic substance production by apple rotting fungi.
Lingnan Sci. J., 1948, **22**: 139-42, bibl. 5.
In a study [by the author, an Associate Professor of Lingnan University] of the production of cell-wall-splitting enzyme and toxic substance or substances by fungi, it was found that *Penicillium expansum* and *Sclerotinia fructicola* secreted large amounts of protopectinase to dissolve the middle lamella of various plant tissues but little or no toxic substance to kill the plant cell, while *Physalospora malorum*, *Lambertella corni-maris*, and *Glomerella cingulata* produced a powerful toxic substance to kill the plant cell but secreted little or no protopectinase to macerate the plant tissue. [From author's summary.]

3025. VAN HIELE, T. 664.85.035.1
Gasbewaring van fruit. **(Gas storage of fruit.)**
Fruitteelt, 1948, **38**: 438-9.
An account of observations on gas storage of apples in Holland. Favourable results were obtained with Cox's Orange Pippin and Laxton's Superb, but Goudreinette proved to be very sensitive to CO_2 and, with 5% CO_2 and 5% O_2, 52% of the fruit developed scald.

3026. LIN, K-H. 664.85.11.035.1
The effect of modified air on the rotting of apples in storage.
Lingnan Sci. J., 1948, **22**: 133-8, bibl. 15.

Various modified atmospheres proved effective in retarding fungal decay in stored McIntosh and Delicious apples.—Cornell Univ.

3027. LUCKWILL, L. C. 664.85.11: 577.17
The effect of growth substances on the storage life of the apple varieties Allington Pippin and Edward VII.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 142-6, bibl. 6, illus.
" It is concluded that growth substances are likely to be of little value in the storage of fruits."

3028. MARSHALL, R. E., HAMNER, C. L., AND KREMER, J. C. 664.85
Retardation of ripening of fruits with the methyl ester of naphthalene acetic acid.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 95-6.
There was no apparent difference in the rate of ripening of Wealthy, McIntosh and Delicious apples and Bartlett and Bosc pears wrapped individually in oiled paper wraps and in oiled paper wraps impregnated with the methyl ester of naphthaleneacetic acid at a concentration of 1,000 p.p.m. and held in slatted crates at 33° F. and room temperatures for 65 days. Varying results followed the application of this substance with and without geon to different fruits under different conditions, indicating that methyl ester may have a retarding effect under certain circumstances but that, if so, its ideal method of application still needs to be determined.—East Lansing.

3029. CRAVENS, M. E., Jr., AND PAUL, P. 634.25-1.547.6: 664.85.25
Degree of ripeness at harvest and peach quality after holding.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 383-6.
In 1947 peaches were picked at three stages of ripeness and held at laboratory temperature. The test shows that fruits picked at the tree-ripe stage were superior until about the 5th day from harvest, after which the quality of peaches picked firm-ripe was more desirable. Hard-ripe peaches were still quite green at the end of the storage period.

3030. CARDINELL, H. A., AND MITCHELL, A. E. 664.85.25: 632.4
Packing house trials to reduce peach-rot.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 460-7.
In the severe brown rot season of 1947, Elberta peaches in wooden boxes were hydrocooled, prior to cold storage, with ice water at 32° F. containing a chlorine-type germicide, " Hypo-Clor ". This treatment compared favourably with the standard commercial sulphur dust treatment in which 10% Zerlate was incorporated. After 7 days' storage at 40° F. plus 4 days at 75-80° F., hydrocooled peaches showed 23% of rot as against 44% in the sulphur-dusted lot. The point of highest infection was found to be the stem end, the point of contact with a diseased fruit ranking second in importance.

3031. CLAYPOOL, L. L., AND ALLEN, F. W. 664.85
Carbon dioxide production of deciduous fruits held at different oxygen levels during transit periods.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 103-13, bibl. 8.
Results of trials are reported from Davis, Calif., on the CO_2 produced at different temperatures and at different oxygen levels by the following fruits:—apricots, plums (Santa Rosa), peaches, pears and grapes.

3032. SHUTAK, V., AND CHRISTOPHER, E. P. 664.85.22
Prolonging shelf life of plums with carbon dioxide.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 231-4, bibl. 6.
Subjecting Burbank, Reine Claude, Santa Rosa and Grandé Duke plums to high concentrations of CO_2 for 15 out of every 24 hours for 5 consecutive days at room temperatures retarded ripening and decreased the incidence of brown rot without ill effects on flavour.—Kingston, R.I.

3033. VENEZIA, M. 664.85.872
Sulla conservazione dell'uva da tavola con mezzi pratici. **(Practical methods of table grape preservation.)**
Ann. Sper. agrar., 1947, **1** (N.S.): 219-62, bibl. 7.
Five years' experiments showed that packing in bentonite in wood barrels enabled grapes to be successfully kept for 5 months. Bentonite proved superior to cork dust, rice chaff, sawdust and other materials, and wood was a better material for the barrels than less permeable substances.—Staz. sper. vitic. Conegliano.

3034. WRIGHT, T. R. 634.13-2.314
Fire blight of Bartlett pears in storage, Wenatchee, Washington, 1947.
Plant Dis. Reptr, 1948, **32**: 58-61.
It is concluded that fire blight of pears is of little consequence after the fruit has left the tree. The disease appears to cause little damage in storage or transit so long as large quantities of visible diseased fruit are not included in the boxes.

3035. YANG, S. L. 664.85.3
Experiments on the storage of citrus fruits in Fuchow. [Chinese.]
Fukien agric. J., 1945, **7**: 2: 97-103.
Two varieties of citrus were used, *C. sinensis* form Sekkan Hayada and *C. tangerina*, Hortet, Tanaka. The freshly picked fruits were divided into 11 lots of 200 and given various treatment before storage. It was found that treatment with 5-8% borax solution was effective against *Penicillium italicum* Wehmer but hastened the wilting of the fruit stalk and the development of *Phomopsis citri* Faw. Similar results were obtained for high temperature (41° C.) treatments. Treatment with 2% borax solution in the cold is recommended because it does not accelerate the development of *Phomopsis* and is effective against *Penicillium*. Sodium carbonate increases the adherence of borax but has no value against diseases. Washing with 3% soap solution decreases slightly *Penicillium* infection. Wrapping in waxed paper has a similar effect. H.C.Y.

3036. LITTAUER, F. 634.31-2.4
Control of *Diplodia* stem-end rot and moulds in Shamouti oranges with nitrogen trichloride (decco process).
Palestine J. Bot. (*R*), 1947, **6**: 205-18, bibl. 2.
A report of a trial in Palestine which confirmed the efficacy of NCl_3 gas in controlling moulds. It was ineffective, however, when used against *Diplodia* stem-end rot.

3037. GONZALEZ, L. G. 664.85.3: 632.111
Effects of freezing on the respiration rate of oranges and lemons.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 132-6, bibl. 1.
A method of determining freezing injury may possibly be evolved from observation on respiration rates of citrus fruits, which are found to be greatly stimulated by exposure to 7° C.—Laguna, P.I.

3038. OLLILA, L. 664.84.21: 632.4
Tuhosienien merkityksestä perunavarastojen turmelijoina suomessa. **(Fungous diseases of stored potatoes in Finland.)** [English summary ½ p.]
Maataloust. Aikakausk., 1947, **19**: 89-98, bibl. 17.
The data presented are based partly on storage trials carried out at the agricultural experiment station Tikkurila and partly on information obtained from questionnaires. Losses from pathogenic diseases in stored potatoes are estimated at 10%, 70-90% of which are due to blight, the

rest to bacteria. *Fusarium* and other fungus species isolated from the tubers were found to be saprophytic. Storage losses should be reduced by growing blight-resistant varieties.

3039. HOYLE, B. J. 664.84.25
Storage breakdown of onions as affected by stage of maturity and length of topping.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 353-60, bibl. 6.

An evaluation of the physiological and rot losses during the storage of onions harvested at different stages of maturity and topped at different lengths.

3040. RADER, W. E. 664.84.13.037: 632.4
***Rhizoctonia carotae* n.sp. and *Gliocladium aureum* n.sp.**
Phytopathology, 1948, **38**: 440-52, illus.

Rhizoctonia crater rot has been found causing severe losses in certain cold stores where the relative humidities have been high; the symptoms are sunken lesions lined with a white flocculent mycelium. Gliocladium rot has been found in both cold and common stores in New York; it causes slightly sunken lesions, sparsely lined with light yellowish to pinkish mycelium, on the sides of the roots, the affected tissues being very hard and leathery and of a light tan colour. The only control believed recommendable is to store carrots at relative humidities below 95% in new or disinfected containers.—Cornell University, Ithaca, New York.

3041. BIOLOGISCHE ZENTRALANSTALT FÜR LAND- U. FORSTWIRTSCHAFT, BERLIN-DAHLEM. 635.65: 632.76
Lebensweise und Bekämpfung des Speisebohnenkäfers. **(Biology and control of the American seed beetle.)**
NachrBl. dtsch. PflSchDienst, 1948, **2**: 16-7.

Infestation of stored bean seed by the American seed beetle, *Acanthoscelides obtectus*, has increased in Germany during the last 10 years. The pest can be controlled by spreading the beans in a layer not more than 4 cm. high and heating them to 60° C. for 6 hours. This treatment does not impair germination but it affects food value, since the killed beetles and larvae remain within the seed. This drawback is obviated by chemical control measures, of which treatment of 100 kg. bean seed with 200 g. Gesarol [DDT] dust deserves special mention.

3042. SYKES, S. M. 664.84/85.037
Quick freezing of fruits and vegetables in U.S.A. and Canada.
Agric. Gaz. N.S.W., 1948, **59**: 185-8.

A review of developments in the U.S. and Canada. The quick freezing industry in N.S. Wales is as yet in its infancy with only one plant in operation.

3043. SCHRADER, A. L., AND SCOTT, D. H. 634.75: 664.85.75.037
Quality comparisons of strawberry varieties as affected by processing with the freezing method.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 246-50, bibl. 1, being *Sci. Publ.* **A162,** *Contr. Md agric. Exp. Stat.* **2057.**

New strawberry varieties and promising selections grown at Beltsville were processed by freezing at −20 to −25° F. and kept in storage for 5 or 10 months. Judged on the basis of colour, texture, and flavour, the varieties and selections considered acceptable to the consumer were U.S. 2644, U.S. 1453, Tennessee Shipper, Tennessee Beauty, Midland, Suwannee, Sierra, Blakemore, Brightmore, Dorsett, U.S. 3241, and Shasta. Berries that were firm-ripe or under-ripe were low in colour and flavour, whereas very ripe berries were low in texture and flavour. Missionary and Howard 17 contributed most frequently to the crosses that resulted in good freezing quality.—Maryland.

3044. SCOTT, L. E., AND SCHRADER, A. L. 664.85.75.037: 577.16
Ascorbic acid content of strawberry varieties before and after processing by freezing.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 251-3, bibl. 5, being *Sci. Publ.* **A163,** *Contr. Md agric. Exp. Stat.* **2058.**

Strawberry varieties and seedlings of especial interest for their quality as a frozen product exhibited ascorbic acid contents ranging from 85·3 to 53·0 milligrams per 100 grams fresh material. After freezing and storage for 5 months, these varieties showed a high retention of ascorbic acid, averaging about 80%, with few varieties below that figure. Storing fresh berries at different temperatures from 32 to 52° F. for 2 to 4 days had little effect on the ascorbic acid content, and there was no measurable effect on the subsequent content of the frozen product after 5 months' storage. [Authors' summary.]—Univ. of Maryland.

Noted.

3045.

a BROWN, G. B. 664.84.13
The effect of maturity and storage on the carotene content of carrot varieties.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 347-52, bibl. 17.

b DEXTER, S. T. 664.8
A colorimetric test for estimating the percentage moisture or the storage quality of farm products or other dry materials.
Quart. Bull. Mich. agric. Exp. Stat., 1948, **30**: 422-6.

c HALLER, M. H. 633.42
Effect of root-trimming, washing, and waxing on the storage of turnips.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 325-9, bibl. 3.

d SCURTI, J. 664.84.31.037
Caratteristiche citologiche e microchimiche degli asparagi congelati. **(Cytological and microchemical characters of frozen asparagus.)** [English summary 9 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 55-61, bibl. 3. —Lab. sper. Fitopat. Turin.

e WARREN, S. 664.84/85.037
Freeze fruits and vegetables.
Circ. Pa agric. Ext. Serv. **317,** 1948, pp. 22, illus. Guide for the housewife.

PROCESSING AND PLANT PRODUCTS.

(*See also* 2490 l, 2954, 2955, 3018m, 3136, 3042-3044, 3045d, e.)

3046. MURNEEK, A. E., AND WITTWER, S. H. 634.11: 577.17
Some factors affecting ascorbic acid content of apples.
Proc. Amer. Soc. hort. Sci., 1948, **51**: 97-102.

Analytical figures of apples from Columbia, Mo., indicate:—that varietal differences are considerable, summer apples, generally speaking, having a higher ascorbic acid content than most winter varieties when harvested in the green or hard ripe stage of maturity; that seasonal differences may be large in all varieties; that storing even for a short time results in loss of ascorbic acid; that among other factors are: condition of tree, N supply, size of crop, size of fruit and exposure to light, the last especially being of great importance.

3047. DAGLISH, C., AND WOKES, F. 634.51: 577.17
Hydrojuglone and apparent vitamin C in walnuts.
Nature, 1948, **162**: 179-80, bibl. 8.
The non-specific dye reductant, present in high concentration in tissues of walnut catkins and resting buds and provisionally termed "apparent vitamin C", was shown to be mainly, if not entirely, a derivative of hydrojuglone or 1 : 4 : 5 trihydroxynaphthalene.—Ovaltine Research Laboratories, King's Langley, Herts.

3048. CHEN, W., AND CHEN, L. J. 635.1/7: 577.16
The effect of cooking and processing on the vitamin C content of fruits and vegetables. [Chinese.]
Fukien agric. J., 1947, **8**: 3-4: 17-22.
Determinations of the vitamin C content were made on 41 kinds of local fruits and vegetables in the fresh state and after boiling (5 min.), frying (3 min.), frying and boiling, or the usual canning procedures. Great differences were found in the different materials. Boiling slightly lowered the vitamin C content of some vegetables (1-2% in cucumber and squash) but increased that of others (6-8% in eggplant and amaranthus). Frying generally resulted in a decrease (1-69%) except in the white turnip. Frying and boiling decreased that of red pepper, onion, etc. (0·6-16%) but increased that of bamboo shoot (15%), leaf cabbage (17%), and garlic (17%). The canning process decreased the C content of all vegetables (complete destruction in the case of Chinese cabbage, cabbage and spinach) except carrot which showed an increase. H.C.Y.

3049. GREBINSKIĬ, S. O. 577.16: 634+635
Vitamins in vegetables and fruit. [Russian.]
Priroda (Nature), 1948, No. 4, pp. 43-5.
A short review, with tables showing vitamin content of a number of vegetables and fruit.

3050. ANTONIANI, C., AND FEDERICO, L. 577.16
Sulla determinazione della vitamina B_1 nei tessuti vegetali col metodo al tiocromo. **(Determination of vitamin B_1 in plant tissues by the thiochrome method.)** [English summary 6 ll.]
Ann. Sper. agrar., 1948, **2** (N.S.): 51-4.
When using thiochrome for determining vitamin B_1 in plant tissues the authors first dehydrated the plant tissue with sodium sulphate and then extracted it completely with sulphurous ether.—Staz. Sper. Freddo, Milan.

3051. BEDFORD, C. L., AND MCGREGOR, M. A. 664.84.037: 577.16
Dehydroascorbic acid in frozen and cooked frozen vegetables.
Science, 1948, **107**: 251-2, bibl. 6, being *Sci. Pap. Wash. agric. Exp. Stat.* **744.**
Data are presented for chard, spinach, peas, snap beans and lima beans. The dehydroascorbic acid found in the fresh vegetables was markedly reduced by scalding, but it increased again during frozen storage. Cooking the frozen vegetable almost completely destroyed the dehydroascorbic acid present.

3052. SADYKOV, A. S. 633.88(58)
Chemical investigation of the plants of Central Asia. [Russian.]
Vestn. Akad. Nauk. S.S.S.R., 1947, **17**: 12: 67-8.
A short account of industrial products (alkaloids, glucosides, dyes, tannins, etc.) derivable from Middle Asia indigenous plants.

3053. TOSELLO, A. 664.8.047
Ensaios sôbre a secagem dos produtos agrícolas. **(Experiments on drying agricultural products.)**
Bragantia, 1946, **6**: 39-107, bibl. 5 [received 1948].
Following an extended mathematical treatment of the problems involved in drying by hot air, data relative to the drying of coffee and castor seed are given.

3054. BOS, J. 664.84.647+664.85.047
Het drogen van groenten en fruit. **(Drying vegetables and fruit.)**
Tuinbouw, 1948, **3**: 97-100.
A popular illustrated account of drying fruit and vegetables with special reference to the drying plants in Holland.

3055. HODGES, F. A. 664.85.37.047: 632.7
Report on extraneous materials in fruit products and beverage materials.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 329-31.
A gasoline flotation method is described and recommended for the determination of insect infestation in whole dried figs.

3056. CALDWELL, J. S., AND OTHERS. 633.841: 664.8.047
The utilization of sweet peppers. Part II. Dehydration.
Fruit Prod. J., 1948, **27**: 247-52, 262, 283-8, 311-3, 333, 346-50 and 365, bibl. 24.
Dehydration tests were made concurrently with the canning trials reported in Part I (Culpepper, C. W., and others, *ibid.*, 1948, 27: 132-40, 153, 164-8; *H.A.*, 18: 1498). Material, in various forms, was dehydrated to 5% moisture when green or ripe, with or without peeling, blanching and sulphuring; the products were judged after 4 to 5 months' storage in sealed containers at 32° F. Losses of ascorbic acid (50-55%) were greater in dried than in canned material; sulphuring after steaming reduced the loss but impaired the flavour. Most of the carotene was retained. Peppers peeled before processing gave products inferior in colour and flavour. Blanching was advisable. The varieties are arranged in order of commercial value for dehydration.—Division of Fruit and Vegetable Crops and Diseases, U.S.D.A.

3057. HIRST, F., AND ADAM, W. B. 664.8.036.5: 634.1/7+635.1/7
Variety trials. Canning and quick freezing.
A.R. Fruit Vegetable Pres. Res. Stat., Campden, 1947, 1948, pp. 11-18.
Strawberries: The 1946-47 trials included numerous new seedling varieties bred by D. Boyes, Cambridge. Brief descriptions are given of their fruit and comments made on their performance in canning and quick-freezing trials. *Raspberries:* Of 7 new East Malling varieties tested for canning and quick freezing in 1946-47 none equalled Norfolk Giant in quality. *Plums:* None of the gage varieties tested in canning trials had a flavour comparable with that of the common greengage. *Pears:* Laxton's Superb proved very promising for canning, having good colour and texture as well as excellent flavour. *Peas:* Very good results were obtained from a canning trial of Sharpe's No. 99 Canner. Onward, Duplex, Miracle and Alderman again proved too large and dark for canning. *Runner beans:* Kelvedon Wonder gave very good results in canning trials over 3 years and has the most natural green colour of all those tested. In general the colour of the quick frozen beans was better than that of the canned beans, but the flavour of the latter had more character.

3058. ATKINSON, F. E. 664.85.22.036.5
Important factors in canning Italian prunes.
Canad. Fd Packer, 1948, **19**: 9: 22-3, 25, 27, 29-30, bibl. 5, illus., being *Contr. Div. Hort., exp. Farms Serv., Dep. Agric. Ottawa*, **690.**
The variety of prune grown in British Columbia is the Italian (Fellenberg) and some of its strains which mature 10 to 14 days earlier. An account is given of the method of separating immature fruit by flotation, and of the procedure for canning mature fruit in syrup.—Summerland, B.C.

3059. CRUESS, W. V., AND SCHEFFER, W. R. 664.85.25.036.5
Canned peach sauce.
Fruit Prod. J., 1948, **27**: 309-10, 329.
Shredded peach flesh is mixed with about one-seventh of its

weight of sugar before processing this sauce. Tasters preferred a product containing 21 to 22% soluble solids.—University of California.

3060. Adam, W. B., Dowson, W. M., and Marsh, R. W. 634.723-2.95
Effect of organic spray residues on canned blackcurrants. II.
A.R. Fruit Vegetable Pres. Res. Stat., Campden for 1947, 1948, pp. 19-29, and *A.R. Long Ashton Res. Stat. for 1947*, 1948, pp. 163-71, bibl. 3.

The conclusions to be drawn from the 1946 and 1947 spraying and canning trials are that, whereas the four sprays of the thiocarbamate type tested are effective in controlling the attack of *Pseudopeziza*, their residues stimulate the rate of production of hydrogen in the cans, even at very low concentrations, and may also adversely affect the flavour. This only applies to cases where the currants are canned whole as dessert fruit, and not as preheated pulp. Heptadecyl glyoxalidine proved to be efficacious and yet had no undesirable characteristic as regards stimulation of corrosion or production of foreign flavour. This spray merits further investigation. [Authors' conclusions.]

3061. Kertesz, B. I., and Sondheimer, E. 634.75: 581.175.11
Retention of desirable colour in strawberry products.
Farm Research, 1948, July, from abstract in *Canad. Fd Packer*, 1948, **19**: 9: 6, 8, 9.

Pelargonidin 3-monoglucoside is the pigment responsible for colour in red strawberries. To obtain information about the factors involved in colour changes during manufacture and storage of strawberry products, the behaviour of this pigment in various circumstances is being studied.—New York Agric. Exp. Stat., Geneva.

3062. Adam, W. B. 664.84.656.036.5
Estimation of maturity of canned green peas. II.
A.R. Fruit Vegetable Pres. Res. Stat., Campden, for 1947, 1948, pp. 30-9, bibl. 2.

Results are given of tests made in 1946 and 1947 to correlate the texture of canned peas, as judged by tasting tests, with estimates based on objective measurements. A method dependent on crushing the peas to a standard proportion of their thickness was found to give more uniform results than estimates based on content of alcohol-insoluble solids or measurement of specific gravity by brine flotation. The superiority of *Lincoln* peas over other varieties tested was noted. The use of hard waters for preparation of the brines used for covering the peas caused a reduction in quality as recorded in the tasting tests, but had no appreciable effect on the results of the object estimates of texture. [From author's summary.]

3063. Burrell, J. R. 664.85.035.4
Acetic acid preserves.
Fd Manuf., 1948, **23**: 168-70, 203-5, 270-3, 275, 309-12, and 362-3.

After an account of the microbiological processes involved in the manufacture of pickles and sauces, the author gives various recipes for pickling vegetables, walnuts, etc.

3064. Etchells, J. L., Jones, I. D., and Lewis, W. M. 664.84.035.2: 577.158
Bacteriological changes during the fermentation of certain brined and salted vegetables.
Tech. Bull. U.S. Dep. Agric. **947**, 1947, pp. 64, bibl. 31.

Results of a bacteriological investigation on the preservation of a number of vegetables by the use of one or more brining and dry-salting treatments have been presented. In most instances, microbial activity of varied intensity accompanied such preservation and was present over a wide range with respect to both the type of vegetable and the amount of salt used. Fermentation resulting from the development of one or more salt-tolerant groups of micro-organisms took place in preservation treatments ranging from 2·5% to 20% salt concentration for the vegetables studied. The predominating groups of micro-organisms found were: the acid-forming bacteria, the coliform group, the yeasts, and the coccus forms. The development of the acid-forming bacteria in the various vegetable fermentations was restricted principally to salt concentrations below 15%. Growth by the yeasts and the coliform bacteria was found over an extended range with respect to the amounts of salt used in the salting and brining treatments (2·5 to 20%). Salt-tolerant cocci, in most instances, were the predominating organisms found in fermentations at high salt concentrations. [From authors' summary.]

3065. Cruess, W. V. 663.813: 664.8.037
Freezing preservation of fruit juices.
Fd Manuf., 1948, **23**: 405-7, bibl. 8.

An outline of a method of processing fruit juices for storage at or below 0° F. Ripe Valencia oranges are disinfected and washed throughly before the juice is extracted. The juice is de-aerated by vacuum and flash heated to 195° F. for 30 to 60 seconds, a step often omitted in commercial practice. The juice is then cooled, sealed in enamelled tin cans in vacuum, and frozen at −35° to −40° F. for about 45 minutes. An indication is given of the possibilities of preserving the juice of various fruits in this way.—University of California.

3066. Pederson, C. S., Beattie, H. G., and Stotz, E. H. 663.813
Deterioration of processed fruit juices.
Bull. N. York St. agric. Exp. Stat. **728**, 1947, pp. 32, bibl. 53, illus.

Changes in the flavour of fruit juices during storage can be correlated with changes in reducing sugars, viscosity, sediment and colour. Colour changes can be measured readily with the spectrophotometer. The characteristic colour of the juice rapidly decreases in storage, and a brown colour and precipitate develop. At least three types of chemical were involved in the deterioration of various juices studied. Synthetic mixtures of a sugar, organic acid, amino acid and phosphate showed similar colour changes. Sulphite and other antioxidants may offer some protection against secondary colour changes, but the most important factor is heat. The total heat applied both during preparation and storage should be kept at a minimum. [From authors' summary.]

3067. Pederson, C. S., and Beattie, H. G. 663.813
Concentration of fruit juices by freezing.
Bull. N. York St. agric. Exp. Stat. **727**, 1947, pp. 27, bibl. 9.

Concentration of fruit juices by freezing concentration depends upon the difference in freezing point of pure water and water containing dissolved solids. Dissolved solids concentrate to the centre of a container during freezing more when frozen slowly than when frozen rapidly. The degree of concentration depends upon temperature of freezing. Efficiency of separation of concentrate from ice depends upon careful control of temperature. The concentrate may be separated from the ice by any of several methods, such as centrifuging, hydraulic pressure, or draining. Due to application of more positive force, the highest efficiency is obtained by the first two methods. However, concentration by draining is feasible and actually higher degree concentrates have been obtained by that method. [Authors' summary.]

3068. Crang, A., James, D., and Sturdy, M. 663.813: 634.11
Domestic apple juice production. Progress report II.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 212-6, bibl. 7.

A clear apple juice can be made using apples as soon as they are brought in from the orchard. The variations in composition of juices from two varieties of apple pressed between October and December showed the increase in turbidity of the juice with the maturity of the apple before pressing. The merits of filter-aids for clarifying cloudy juices are discussed. A method of comparing turbidity in various apple juices using the Spekker absorptiometer is described. [From authors' summary.]

3069. HAYES, K. M., ESSELEN, W. B., Jr., AND FELLERS, C. R. 663.813: 634.11 +634.76
Apple-cranberry juice.
Fruit Prod. J., 1948, **27**: 308, 329, bibl. 1, being *Contr. Mass. agric. Exp. Stat.* **669.**
An attractive and palatable blended fruit juice can be made by blending from 12 to 15% cranberry juice with apple juice. In the preparation of such a juice it is necessary to give the apple juice a preliminary flash pasteurization treatment in order to inactivate enzymes which would otherwise destroy the red colour of the cranberry juice when the two are mixed together prior to final processing. [Authors' summary.]

3070. SINGLETON, G. 663.813: 634.3
Experiment with citrus juices.
Fruit Prod. J., 1948, **27**: 314-5, 331.
An account of experiments to ascertain the nature of the agent responsible for the deterioration of citrus juices. The causative agent separates in the foam on the surface of hot citrus juice, from which it can be removed—with the peel oil—by vacuum distillation. The peel oil can be trapped and returned to the juice, whose flavour it improves.

3071. WILSON, J. B. 663.813
Report on flavors and non-alcoholic beverages.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 200-3.
Dealing with the determination of essential oil in emulsions.

3072. HUGHES, E. B. 633.73: 581.192
On the chemistry of coffee.
Chem. Industr., 1948, No. 29, p. 462.
The short article is the summary of a paper read to the Food Group of the Society of Chemical Industry in April, 1949. It discusses the principal changes in composition that take place when coffee beans are roasted.

3073. LEUBUSCHER, C. 633.74-1.56
The cocoa-processing industries.
Bull. imp. Inst., 1947, **45**: 225-44, bibl. 25.
Includes brief notes on countries growing cacao and the few attempts made to establish cocoa-processing industries in them.

3074. ANON. 016: 633.74-1.56
Literature survey on cacao curing.
Cacao Inform. Bull., 1948, **1**: 10: 1-2.
The following items are quoted from the summary and conclusions of this report on the literature of cacao curing issued recently by the Research and Development Department of General Foods Corporation, U.S.A. *Summary:* No accepted knowledge exists of the real nature of cacao curing, nor has consistent and co-ordinated research been done on the subject. Whereas early workers recognized the importance of temperature and oxidation, and the need for preserving the enzymes, no conclusive work has been done to demonstrate that bacterial fermentation can be avoided. Workers are divided in their opinions as to whether bacterial fermentation is necessary. The manner in which cacao is handled, and the variety of organisms found, show that what is supposed to be a properly prepared product, as judged by local producers, is obtained by widely different means. This is probably the major factor in the variability of the raw material. Workers agree that fermentation aids by removing pulp and that the germ must be killed. They disagree as to the desirability of the alcohol and acid formed. Agreement appears to have been reached that the three major groups of cacao—Forastero (purple), Trinitario (pink to purple), and Criollo (white)—will yield different products even if handled in the same manner; but no direct comparative experiments have been recorded that show these differences. The early literature discloses several references to post fermentation by processors, and mentions the desirability of handling the beans in the tropics so as not to destroy the enzymes, thus permitting the manufacturer to modify the product to suit his needs. *Conclusions:* Death of the embryo is an essential preliminary to the changes that take place during curing. After the embryo dies, the primary process is an oxidation of the tannins by oxidases within the cotyledons. It follows that the beans should not be heated beyond the inactivation temperature of the oxidases; and that ample aeration should be provided, especially during a slow, low-temperature, drying process. Acetic acid formed during fermentation penetrates the shell and helps to kill the embryo. Curing by fermentation has other advantages: substances formed during fermentation are essential for the best flavour in the roasted bean. The initial stages of fermentation are improved by inoculating with yeast. Precautions, in addition to those mentioned, should be taken to assure the proper microbiological development in the fermenting pulp.—Inter-Amer. Inst. Agric. Sci. Turrialba, Costa Rica.

3075. SHEARER, A. 633.61-1.577
Sugar cane wax, its properties and uses.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 127-59, bibl. 4, illus.
Sugar cane wax has once again come into prominence as a likely substitute for carnauba and other waxes. A description of the extracting process is followed by a survey of the author's experimental work in connexion with the establishment in 1943 of the wax factory at Nambour, Queensland. The investigations show that the wax can be satisfactorily bleached, and is then useful for a number of industrial applications. The fatty portion of cane wax is shown to be a source of fatty acids and other products of determinate value. They are at present wasted, but production on a larger scale should warrant further research into methods for their economic separation.

3076. SCHIMMEL AND CO., INC. 633.85
Annual report on essential oils, aromatic chemicals and related materials 1945.
Schimmel & Co., Inc., New York, 1948, pp. 127, bibl. 184, illus.
This report reviews developments in the cultivation of crops producing essential oils and research concerning the chemistry of the products. International trade in natural and synthetic essential oils is outlined in a short statistical section.

3077. BURTIS, E. L. 633.85 +634.61
Fats and oils.
Industr. Engng Chem., 1948, **40**: 998-9.
The vegetable oils discussed include coconut oil from the Philippines, which is the leading imported oil used in the United States; babassu and palm kernel oil from Brazil and the Dutch East Indies respectively; tung oil; and castor oil.

3078. SERVICE DE DOCUMENTATION DE L'I.T.E.R.G. 633.85-1.56
Traitement des graines oléagineuses par le procédé Skipine. **(The treatment of oil seeds according to the Skipine process.)**
Oléagineux, 1948, **3**: 384-6, bibl. 7.
A description is given of a method of oil manufacture from seed which is employed in Russia to great advantage. It is based on the principle of displacing the oil in the seed by water.

3079. SKEEN, J. R. 665.327.3
Olive oil.
Soap san. Chem., 1948, **24**: 47, 187.
A statistical summary of olive oil production, largely in the Mediterranean Basin, and of imports into the United States during the period 1936-47 inclusive.

3080. HSU, P. T. 633.85
The detection of the presence of tung oil in edible vegetable oils. [Chinese.]
Fukien agric. J., 1945, **7**: 2: 49-62.
The iodine number of tung oil, tea oil, peanut oil, and their mixtures are determined. The iodine number of tung oil is 164-166 and that of the others about 90. When edible oils are adulterated with tung oil, the iodine number is between 102 and 141. A qualitative colour test with nitric acid (Hauchecorne test) proved to be sensitive to 1% tung oil in the edible oils. – H.C.Y.

3081. BOURLET, G. 633.85(666.8)
L'Afrique au travail. Les huileries du Plan. **(Palm oil production in French West Africa.)**
Oléagineux, 1948, **3**: 363-72.
Eight oil mills are in the process of construction near the coast in the French territories of West Africa, as part of a scheme of the French Government to utilize the enormous palm oil resources of its African colonies. The scope of the project and the technical and other problems involved are discussed.

3082. VERHAAR, G., AND DEYS, W. B. 633.72: 633.85
Theezaadolie I. **(Tea seed oil I.)** [English summary 5 ll.]
Arch. Theecult. Ned.-Ind., 1948, **16**: 17-24, bibl. 25, being *Meded. Proefstat. West-Java.*
A review is given of the available data on the economic value of tea seed oil. Its chemistry and technology are discussed and several technical applications are mentioned. [From authors' summary.]

3083. WILBAUX, R. 633.912: 633.85
Graines d'*Hevea brasiliensis*: possibilités économiques d'extraction d'huile. **(The economics of extracting hevea seed oil.)**
Bull. agric. Congo belge, 1948, **39**: 601-8, bibl. 4.
The estimated seed production of hevea plantations in the Congo is too small to justify the erection of a factory solely for the extraction of the oil; but it might prove economic to use existing machinery, for example palm kernel oil plants.

3084. NAUDÉ, C. P. 633.71-1.57
The production of nicotine sulphate from South African waste tobacco.
Sci. Bull. Dep. Agric. S. Afr. **278**, 1947, pp. 128, bibl. 65, illus., 1s.
Extensive experiments are reported. The construction and operation of a pilot plant are described: aqueous extraction is followed by distillation and concentration of the nicotine sulphate. Ammonium sulphate is produced as a by-product, and the extracted tobacco residue is of value as manure. The plant costs £44, and it could be operated profitably with a retail price of 30s. per gallon of 40% nicotine sulphate when waste tobacco containing 2% nicotine can be obtained at ½d. per lb. (plus ½d. per lb. for each additional 1% nicotine).

3085. BROZZETTI, P. 633.71: 636.085
La digeribilità ed il valore nutritivo dei residui dell'estrazione dell'olio dai semi di tabacco *Nicotiana tabacum* L. **(The digestibility and nutritive value of tobacco seed cake.)** [Summary in English and German.]
Il Tabacco, 1948, **52**: 131-45, 178-90, bibl. 13.
Tobacco seed cake is rich in protein and fats and can be used for feeding domestic animals. Tobacco seed meal has a high percentage of protein, has little fat, but is rich in crude fibre.—Univ. Perugia.

3086. BRAAK, H. R. 633.912-1.56
Kans op claims bij coagulering met zwaveligzuur. **(The coagulation of rubber with sulphuric acid.)**
Bergcultures, 1948, **17**: 1: 15, 17.
The use of SO_2 solution for coagulating rubber is being investigated. Certain defects in crepe rubbers were ascribed to its use when acetic acid and formic acid were scarce.—Proefstation West-Java.

Noted.

3087.

a ALTHUISIUS, F. 633.912: 633.88
The utilisation of rubber oil as an anti-malaria oil. *Chron. Natur.*, 1948, **104**: 68-71.

b CARPENTER, B. R. 547.458.88
Pectin and allied substances. A brief review of progress since 1938.
Sci. tech. Surveys, Brit. Food Mfrs Ind. Res. Ass. **2**, 1947, pp. 11.

c CHALLINOR, S. W., AND BURROUGHS, L. F. 663.3
The chemistry of cider. 1. Some aspects of the chemical composition of Yarlington Mill and Medaille d'Or ciders.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 172-92, bibl. 25.

d CROSS, W. E. 664.11.002.67
Las investigaciones de la Estacion Experimental Agricola referentes a los sub-productos de la industria azucarera. **(Work on the by-products of sugar cane by the Tucuman experiment station.)**
Bol. Estac. exp. Agric. Tucumán **58**, 1946, pp. 18, bibl. 28.

e CRUESS, W. V. 664.84.656
Improved method of packing frozen peas.
Fruit Prod. J., 1948, **27**: 344.
With addition of 3% sugar.

f CURL, A. L., AND VELDHUIS, M. K. 663.813: 634.31
The composition of the sugars in Florida Valencia orange juice.
Fruit Prod. J., 1948, **27**: 342-3, bibl. 6.

g GILLESPY, T. G. 664.8.036.5: 632.3
The heat resistance of the spores of thermophilic bacteria. II. Thermophilic anaerobes.
A.R. Fruit Vegetable Pres. Res. Stat., Campden, for 1947, 1948, pp. 40-54, bibl. 7.

h JAMES, D. P. 663.3: 577.16
Some vitamins of the B group in cider.
A.R. Long Ashton Res. Stat. for 1947, 1948, pp. 192-6, bibl. 3.

i KUNZE, F. M. 632.951: 634.11
Addition of selenium to wet-ash procedure for the determination of mercury in apple peel.
J. Ass. off. agric. Chem. Wash., 1948, **31**: 438-41.

j MAYMONE, B., SBLENDORIO, A., AND CECI-GINESTRELLI, D. 634.63: 581.192
Ricerche sulla composizione chimica, sulla digeribilità e sul valore nutritivo delle foglie di olivo (*Olea europaea* L.) verdi, essiccate, insilate. **(Investigations of the chemical composition, digestibility and nutritive value of green, dried and ensiled olive leaves.)** [English summary 1 p.]
Ann. Sper. agrar., 1947, **1** (N.S.): 71-88.—Ist. sper. Zoot. Rome.

k MAYMONE, B., AND CECI-GINESTRELLI, D. 634.63: 581.192
Ricerche sulla digeribilità e sul valore nutritivo dei ramoscelli di olivo (*Olea europaea* L.). **(Investigations of the digestibility and food value of olive twigs.)** [English summary 14 ll.]
Ann. Sper. agrar., 1947, **1** (N.S.): 89-95.—Ist. sper Zoot. Rome.

l MINDLER, A. B. 633.61-1.56
Demineralization of sugar cane juice. A pilot plant study.
Industr. Engng Chem., 1948, **40**: 1211-5, bibl. 8.

m MORS, W. B. 633.912-1.56
A hemicelulose das sementes de *Hymenaea parvifolia* Huber e seu emprego na cremagem do latex de seringueira. **(The hemicellulose of the seeds of *Hymenaea parvifolia* and its use for creaming hevea latex.)**
Bol. técn. Inst. agron. Norte Belém **6**, 1946, pp. 42, bibl. 42 [received 1948].

n MOULTON, J. E. 664.85.75.057
The effect of pre-packaging and refrigeration of strawberries on the water loss, spoilage, vitamin C content, and sugar-acid ratio of the fruit.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 263-8, bibl. 3, being *J. Art. Mich. St. agric. Exp. Stat.* **870** (N.S.).

o PRATT, H. K., YOUNG, R. E., AND BIALE, J. B. 664.85.653.035
The identification of ethylene as a volatile product of ripening avocados.
Plant Physiol., 1948, **23**: 526-31, bibl. 13, illus.

p RENTSCHLER, H., AND PEYER, E. 663.825
Über eine vereinfachte Bestimmung der Gesamtsäure in Weinen und Traubenmosten mit dem Säuremesser. **(A simplified total acid determination in wines and grape juices by titration.)**
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 247-50.

q SCOTT, L. E., AND WALLS, E. P. 635.64: 577.16: 663.813
Ascorbic acid content and sugar-acid ratios of fresh fruit and processed juice of tomato varieties.
Proc. Amer. Soc. hort. Sci., 1947, **50**: 269-72, bibl. 5.

r STRACHAN, C. C. 664.8.036.5
Product quality as influenced by enzymes.
Canad. Fd Packer, 1948, **19**: 8: 24-5, 27, 29, 31.

s VENTON, C. B. 633.61-1.577
The recovery of wax from [sugar cane] factory mud.
Proc. 15th Conf. Qd Soc. Sugar Cane Tech., 1948, pp. 7-20, bibl. 8, illus.

NOTES ON BOOKS AND REPORTS.

3088. AGETE Y PIEÑRO, F., AND OTHERS. 633.61(729.1)
La caña de azúcar en Cuba. **(Sugar cane in Cuba.)**
Ministerio de Agricultura, Havana, 1946, 2 vols., pp. 603, bibl. in text, illus.

This compendium is the work of eleven experts on the several aspects of sugar cane growing. The well illustrated descriptions of the varieties grown in Cuba are most impressive; these take up most of the first volume, in which there are also chapters on the history of sugar cane in Cuba and on the local cane soils. In the second volume the following topics are discussed: cultivation, manuring, irrigation, agricultural machinery, diseases and pests of sugar cane, and the manufacture of sugar. Although, as the title indicates, most of the text is based on Cuban practices, the book is of considerable interest to those concerned with the cultivation of sugar elsewhere.

3089. BARTON, L. V., AND CROCKER, W. 631.531: 634/635
Twenty years of seed research.
Faber & Faber, London, 1948, pp. 148, plates 21, figs. 10, 21s.

The purpose of this book is to place before a wider public the results of a prolonged period of research on seeds, completed or still in progress at the Boyce Thompson Institute for Plant Research, Yonkers, New York.

The period under review covers 20 years. Much, if not all, of the material has already seen the light in amplified form in scientific journals or is common knowledge, and so the research worker who keeps abreast of his literature may not be over-enthusiastic in his welcome. But to commercial growers, seedsmen and others to whom such literature may be largely inaccessible the results set out should prove interesting and useful.

The book is in two parts, the first being concerned with germination problems, the second with storage and the life span of seeds. The chapter on weed seed germination serves to show how necessary to the control of a difficult weed is a thorough understanding of the characteristics and behaviour of its seed. That stratification and low temperatures are prerequisites for the germination of many seeds, e.g. the *Rosaceae*, is well known to our growers, but to them the chapter providing definite data on the length of the stratification period and the optimum temperatures for a number of selected species will be useful. Coming now to a discussion on internal breaking pressures an ingenious technique is described whereby the internal breaking pressure of the black walnut (*Juglans nigra*) was revealed as no less than 627 pounds. How this resistance is overcome in nature is a problem still to be determined. Rapid viability tests of slow germinating seeds by means of excised embryos and the changes indicating viability or the reverse are well illustrated in colour for a few species. Extensive experiments on the efficacy of some so-called "growth-substances" have shown that far from hastening germination they are more likely to inhibit it. In Part II the most useful chapters are those on factors affecting the keeping quality of seeds and on the storing of vegetable seeds. The references which cluster at the foot of each chapter and the brevity of the chapters themselves serve to show the extreme difficulty of compressing into so small a space such a vast amount of useful information. This difficulty has not been entirely overcome. G.St.C.F.

3090. BECKER-DILLINGEN, J. 631.8: 635 + 633.8
Handbuch der Ernährung der gärtnerischen Kulturpflanzen einschliesslich der Heil- und Gewürzpflanzen. **(Nutrition of garden plants, including drugs and spices.)**
P. Parey, Berlin, 1943, 3rd edition, pp. 526, illus., RM. 25 [received 1948].

This is another (see *H.A.*, 18: 2298) of the seven manuals written by the author for agriculturists and horticulturists. Its aim is to collect the widely scattered data on the nutrition of garden plants and to present them in the form of a text and reference book. The character of a textbook for students prevails in the first three sections (pp. 313) which deal with plant nutrition, soil science and manures and manuring generally. The nutritional requirements of individual horticultural crops are usefully dealt with in section IV (pp. 207), (1) vegetables, pp. 105; (2) drugs and

spices, pp. 14; (3) vegetable seed crops, pp. 2; (4) ornamentals, pp. 33; (5) top and soft fruit, pp. 42; and (6) vines, pp. 10. Vegetables are discussed very fully, with separate paragraphs for each crop in turn, on ash composition, nutrient requirements and absorption of nutrients, soil requirements and manurial recommendations. Graphs illustrate the increase in dry matter and the amount of N, P, K, Ca absorbed in each month of the growing season. The comparative scarcity of data on the needs of fruit plants is reflected in the less detailed treatment of fruit crops, about half the space allocated to these chapters being devoted to photographs. It may be noted that much of the information on fruit presented refers to work done at the East Malling and Long Ashton Research Stations in England. Sixteen colour plates show deficiency symptoms of various crops. Bibliographical references at the bottom of the page acknowledge the source of the data used and add to the value of the book for research workers.

3091. BURTON, W. G. 633.491
The potato.
Chapman & Hall, London, 1948, pp. 319, bibls. numerous, illus., 25s.

The reader will find nothing on the technique of breeding, nor will he learn how to plant the potato to best advantage in his garden or commercially. But apart from this there are, surely, extremely few problems in the life and death of the potato which are not usefully and clearly discussed in this fascinating biography.

Not only is the story racily told, but every statement is supported by authority quoted at the end of each chapter. A complete author index at the end removes any disadvantage inherent in such piecemeal citing of authorities and a sufficient subject index gives access to all problems discussed. A most entertaining chapter on the history of the potato in the British Isles from its introduction some time before 1597 is followed by one on varieties old and new and their characteristics, and then by four chapters, one each, on the factors affecting yield and composition, namely (1) climate, length of growing season and soil, (2) manuring, (3) pests and diseases, and (4) varieties and source.

Next the distribution and composition of the dry matter in the potato are discussed, to be followed by a consideration of (1) nutritive value and (2) cooking quality and factors affecting it. The chapter on storage includes the latest developments in this field, and whether you want to prolong or curtail dormancy or to decide on type of store, you will find the answer here.

What appear to be useful afterthoughts are appendixes, two of which concern, very briefly, the use of the potato other than for human consumption, i.e. for the production of starch, alcohol, dextrines and glucose; and the use of specific gravity as a guide to the content of dry matter and starch in the tuber.

The author describes his work as an attempt from the viewpoint of a plant physiologist to summarize our knowledge of the potato as a source of food. He has achieved his purpose without a moment's dull writing—no mean feat with so prosaic a subject. D.A.

3092. CAMP, W. H., RICKETT, H. W., AND WEATHERBY, C. A. (compiled by). 41.312
International rules of botanical nomenclature.
Brittonia, 1948, **6**, No. 1, pp. 1-120. The Chronica Botanica Co., Waltham, Mass., and Wm. Dawson & Sons Ltd., London, $3.50.

All known living organisms have been given scientific names, some of which are retained and recognized by biologists, while others have been rejected because they do not conform to international "rules". In the application and use of such names it is essential, therefore, that all botanists should be conversant with the International Rules of Botanical Nomenclature, formulated by the International Botanical Congresses of Vienna, 1905, Brussels, 1910, and Cambridge, 1930, and adopted and revised by the International Botanical Congress of Amsterdam, 1935. The present book, with its 74 "articles" and with notes and appendixes, has been compiled from various named sources and is here made available for those who may have occasion to name plants or who frequently use plant names. It is a second printing of an unofficial, special, limited edition issued for members of the American Society of Plant Taxonomists in 1947. Most of the book (pp. 33-111) is taken up with Appendix III, Nomina Generica Conservanda. Of special interest to horticulturists is Appendix VII, Nomenclature of Garden Plants, compiled by the late A. B. Rendle from rules drawn up at the International Horticultural Conference of London in 1930. Unfortunately no reference is made to the discussion on nomenclature at the 12th International Horticultural Congress, Berlin, 1938, or to the recommendations made by the Nomenclature Committee of that Congress, probably because official copies of the report of the Congress (although dated 1939) have not been generally available.

3093. CHASE, L. J. H. 631.544
Cloche gardening.
Faber & Faber, London, 1948, pp. 196, illus., 10s. 6d.

This book, though written specifically for the amateur gardener, should have a much wider appeal and, in fact, many of the excellent illustrations show commercial installations.

Our one complaint is that it makes everything appear too easy, but doubtless, if one very exactly followed all the directions given, the apparent ease would vanish. Specific instructions are given for the use of cloches with a large number of vegetables, flowers and small fruits and for the cultural operations necessary as well as in the propagation of cuttings. Notes are given of maintenance and repair and a useful appendix suggests appropriate times for sowing different crops under cloches in different parts of England. Chapters are devoted to design and developments of different types of cloche and to the planning of a cloche installation.

3094. CHEVALIER, A. 633.73
Les caféiers du globe. Fasc. II. Iconographie des caféiers sauvages et cultivés et des rubiacées prises pour des caféiers.* **(Illustrations of wild and cultivated coffee trees and of other *Rubiaceae* mistaken for coffee.)**
Lechevalier, 12 Rue de Tournon, Paris, 1942, pp. 36+158 plates, bibl. 8, 1,200 fr. [received 1948].

This volume, published 12 years after volume I, contains, apart from its 158 plates, brief introductory sections on classification and such subjects as: new coffee species, coffee research in the French colonies, coffee cultivation by natives, the discovery of new coffee species in Africa and Madagascar, hybrids and mutations.

3095. CHEVALIER, A. 633.73
Les caféiers du globe. Fasc. III, Systématique des caféiers et faux-caféiers. Maladies et insectes nuisables. **(Classification of coffee and pseudo-coffee trees. Diseases and pests.)**
Lechevalier, 12 Rue de Tournon, Paris, 1947, pp. 356, illus., 1,000 fr.

This third volume† is divided into three main parts, (1) research into classification, (2) nomenclature and systematics, and (3) the enemies and diseases of coffee. There are 17 plates and over 200 figures.

3096. COPPER DEVELOPMENT ASSOCIATION. 546.56: 63
Copper compounds in agriculture and industrial microbiology.
Publ. Copper Development Association, London, **41**, 1948, pp. 117, bibl. 28, illus.

* Noted *H.A.*, 17: 2665d.

† Vol. I appeared in 1929 (see *H.A.*, 1: 91) and Vol. II in 1942 (see above, 3094).

This publication includes a detailed account of the control, by means of copper, of a large number of diseases of horticultural crops. Other topics covered include insecticides, seed treatment, weed control, and the role of copper as a minor element in the nutrition of plants.

3097. GORRIE, R. M. 631.459+631.67
Soil and water conservation in the Punjab.
Punjab Govt. Book Depot, Lahore, 1946, pp. 290, illus., Rs. 5 or 7s. 6d.

Water conservation practices are of the utmost interest to the horticulturist and the information given in this book is no exception. The chapter devoted to wind erosion and dry farming technique with many observations on cover crops will be found particularly useful.

3098. HELLYER, A. G. L. 634/635
The amateur gardener.
Collingridge, London, 1948, pp. 806, illus., 25s.

More books must have been written about gardening than about any subject except religion and that room could be found for yet another, especially one as portly as the volume to be noted, might be open to doubt. But not, we think, for long. It requires but a glance at the listed contents to discover that no aspect of gardening, as it concerns the amateur, has been left unconsidered, and a closer examination of the pages will show with what competent diligence the work has been done. As Editor of so popular a journal as *Amateur Gardening*, Mr. Hellyer will be well conversant with the trials and perplexities which at one time or another confront every home gardener. The welcome publication of his book should do much to relieve the pressure on his "Answers to Correspondents" column. As an introduction to the first principles of gardening the book should prove invaluable to beginners, and to those more skilled it will prove a reference book in which the searcher will seldom fail in his quest, for not only are all gardening operations discussed with great thoroughness and in the light of the many important results obtained in recent scientific research, but a vast number of garden plants are given individual and ample consideration. There is a copious index. The photographs, mainly to illustrate gardening operations, admirably serve their purpose. That this book will command a large public we have no doubt whatsoever.

G.St.C.F.

3099. HOWES, F. N. 634.5
Nuts.
Faber & Faber, London, 1948, pp. 246, bibl. 62, illus., 18s.

We are grateful to Dr. Howes for bringing under one cover a vast amount of scattered information which would take the normal man many months to disinter, if indeed it were ever possible. The author deals generally with such subjects as the food value of nuts and their processing and storing. He then considers first such tropical nuts as either frequently or occasionally come on the home market, i.e. Brazil, sapucaia, swarri, macadamia, coconut, peanut, pili, oyster, giving a brief account of where and under what conditions each is grown. Next he passes to the nuts of temperate climates including pistachio, almond, walnut, chestnut, barcelona, pecan, pine kernel and, lastly, edible acorns. He devotes only a short and rather disappointing section to nuts in Britain and about an equal number of pages—about 25—to 80 other miscellaneous, little-known nuts. To the "nut-minded" his 19 pages of recipes will be very acceptable. It is eminently a book to get and consult.

3100. INGRAM, C. 635.976.32
Ornamental cherries.
Country Life, London; Charles Scribner's Sons, New York, 1948, pp. 259, 30s.

Mr. Collingwood Ingram, who must surely know more about the ornamental cherries than any man living and to whose achievements in their cultivation no less than to his skill in unravelling their complexities of nomenclature and identification the present vogue for these plants must be largely attributed, has produced a book which will remain the standard authority for a very long time. For this is the study of a lifetime carried out by an enthusiast possessed of knowledge and skill in high degree, who has, moreover, been able to conduct his researches as he willed at home and abroad, unhampered by difficulties which would make such a task impossible to-day. A happy medium has been struck between the popular and scientific sides of the subject, the matter being so arranged that those who prefer horticulture to taxonomy will find skipping purposely made easy. Part I deals with general matters including the ornamental use of cherries and suitable varieties for various purposes, propagation by budding and grafting, by cuttings of those few varieties that respond to this treatment and by seeds. The last method is mainly used in the raising of hybrids. There is a brief page or two on planting. A most instructive chapter is that on the production of dwarfed trees in pots, a Japanese art that the author has mastered to perfection, to judge from the charming plate showing a 22-year-old Fuji cherry of his own dwarfing—a case of *ars longa* though hardly of *vita brevis*. Pests and diseases are fortunately not generally troublesome, so that the chapter in which they are discussed ends on the comforting jest—"Japanese cherries are like donkeys, one never sees a dead one". Notes on history and folklore, literature and nomenclature bring Part I to a close. Part II deals with the deciduous wild species and their varieties. A revised classification is given, but the interest to most will lie in the able and stimulating discourse, essays in miniature, with which each of the 65 species or sub-species is introduced. In Part III the more noted varieties of the Sato Zakura, or so-called Japanese flowering cherries, are similarly treated. There are a number of excellent illustrations, eight of them being from water colours by the author, the remainder a series of highly effective photographs. G.St.C.F.

3101. JOHNSTONE, K. H. 635.1/7
Vegetable culture.
Thos. Nelson, Edinburgh, 1948, pp. 268, illus., bibls., 7s. 6d.

To say that this is a quieter, less peremptory book than that of Simons' [see below 3113] is not to imply that it is less useful. May one, perhaps, suggest that whereas Simons has so packed his book full of knowledge that the practical gardener can "get on with it and not have to ask questions", Dr. Johnstone's book is rather more spaciously presented and is excellently documented, thus directly inciting the studious-minded to follow up its advice with a perusal of the specialist works noted.

The author concerns herself only with vegetable growing in the open. Her illustrations, though pleasing to the eye and demonstrative of vegetable countryside features, are only moderately informative on the intricacies of the several practices portrayed. Her introduction to vegetables is by appraisement of their qualities and consideration of what we hope to find in them. Their demands are then discussed and afterwards their cultivation, manuring and mechanical handling. But though she gives the origin of the seed of most of our common types, neither she nor Simons deal with cultivation for seed. Sales and marketing are briefly noted, as are pests and diseases in general. More than half the book is devoted to particular vegetables and the common garden herbs, and here the reader will get a very excellent idea of modern practice in this country.

3102. FLIEG, O., AND OTHERS. 63(43)
Arbeiten der Landwirtschaftlichen Versuchsstation Limburgerhof. Ein Rückschau auf Entwicklung und Tätigkeit in den Jahren 1914 bis 1939. **(The work of the agricultural research station of Limburgerhof. A review of its development in the years 1914 to 1939.)**
Landwirtschaftliche Versuchsstation Limburgerhof, Saarpfalz, 1939, pp. 485, illus. [received 1948].

Limburgerhof was the agricultural research station of the I. G. Farben company. This review of 25 years of its work covers a wide range of subjects in the fields of agricultural chemistry, soil science, plant physiology, plant protection, manuring and vegetable growing. [The station is now under the direction of the Badische Anilin- und Sodafabrik.]

3103. MALHERBE, I. DE V. 631.8: 634.1/8 + 633.61
Soil fertility.
Oxford University Press, London and Capetown, 1948, pp. 296, illus., 21s.

The author, who is professor of agricultural chemistry at Stellenbosch, has been induced to bring out an English version of the 6th Afrikaans edition of his textbook, which will be of great value to English readers. It is primarily written for students and as such lays down the fundamentals on which successful systems of soil fertility conservation must be based. The whole field of agricultural chemistry is covered, but the sections likely to be of particular interest to our readers are those on green manuring, manuring of potatoes, manuring of orchards and vineyards, and the seven pages on the manuring of sugarcane specially written by H. H. Dodds, Director of the Experiment Station of the South African Sugar Association, Mount Edgecombe, Natal. The grower of citrus and deciduous fruits in other parts of the world will learn much from the author's reasoning, primarily applied here to S. African conditions of climate and geography.

3104. MALTHA, D. J., AND OORTHUYS, C. 63(492)
Agriculture in the Netherlands.
Contact Publishing Company, Amsterdam, pp. 37 + 144 photographic plates.

No better introduction to Dutch agriculture could be wished for than this work by the Ministry's librarian at The Hague. Like many Dutch productions, it combines beauty with utility and the result is both extremely restful to the eye and satisfying to the enquiring mind.

In such small compass the author does not attempt to compress detail, but he does manage to give a general idea of the many sides of Dutch farming life and of the districts where particular phases of agriculture are important. The horticulturist will find that his chief interests lie roughly in a triangle, one of whose sides is formed by the west coast running south from below the island of Texel, a second runs from Middelburg in Zeeland to Wageningen in the centre of the country and the third from Wageningen up to and north through Amsterdam to join the first. Nearly one-third of the remarkably fine illustrations are devoted to horticultural operations, including the famous method adopted by the Dutch for auctioning their products. D.A.

3105. MITCHELL, R. L. 63: 544.6
The spectrographic analysis of soils, plants and related materials.
Technical Communication, Commonwealth Bureau of Soil Science, **44**, 1948, pp. 183, 12s. 6d.

This Technical Communication will be of interest chiefly to a small but growing circle: those engaged on spectrographic work in some branch of agricultural research. The author points out that the work is largely a description of the methods adopted and improved at the Macaulay Institute of Soil Science, and so full details are given of the Lündegårdth Flame, the D.C. arc and the Cathode Layer methods, while the many other methods in use in other laboratories are only briefly described, with sufficient references to make it easy for a worker to find full information on any method likely to meet the requirements of his own work.

The up-to-date and comprehensive bibliography and the appendixes giving specialized log tables, etc., make the work a valuable addition to the library of a spectrographic laboratory. Dr. Mitchell's remarks on the preparation of samples for analysis, the precautions necessary to avoid contamination at any stage, and on concentration methods for trace elements, will be of interest and value to workers in this field.

The final chapter dealing with the application of spectrographic methods to the analysis of soils, plants, fertilizers, etc., is a very short discussion of a large subject, and it is to be regretted that more space could not have been given to it, perhaps at the expense of the opening chapters on the theory of spectrography and photographic plates, on which subjects the literature is already voluminous and familiar to most spectrographers. S.G.T.

3106. MURNEEK, A. E., WHYTE, R. O., AND OTHERS. 581.143.26.03 + 612.014.44
Vernalization and photoperiodism—A symposium.
Lotsya, Vol. I, 1948, pp. 196, illus. Chronica Botanica, Waltham, Mass.; and Wm. Dawson, London, $4.50.

This impressive first volume of *Lotsya*, a biological miscellany, is a pleasant reminder that true international co-operation is still a reality, at least amongst scientists. The symposium opens with two articles on the history of research into vernalization and photoperiodism by R. O. Whyte and A. E. Murneek, respectively. Then follow nine articles, by various authors, on related aspects of the main subject—the physiology of flowering. These articles and their authors are: Hormones in relation to vernalization and photoperiodism, by K. C. Hamner; Wave length dependence and the nature of photoperiodism, by H. A. Borthwick, M. W. Parker and S. B. Hendricks; The photoperiodicity of flowering under short day with supplemental light of different wave lengths, by G. L. Funke; Nutrition and metabolism as related to photoperiodism, by A. E. Murneek; Anatomical and histological changes in relation to vernalization and photoperiodism, by R. H. Roberts and B. E. Struckmeyer; Length of day in the climates of past geological eras and its possible effects upon changes in plant life, by H. A. Allard; Vernalization and photoperiodism in the tropics, by S. M. Sircar; Some preliminary observations of phenological data as a tool in the study of photoperiodic and thermal requirements of various plant material, by M. Y. Nuttonson; Thermoperiodicity, by F. W. Went. Reprints of two articles by E. Bünning and one by A. Lang, all three in German, appear as special supplements. The study of vernalization and photoperiodism in plants has shown how the genetically determined rhythm of development can be modified by controlling the environment. But while the study of the biological processes concerned in vernalization has added greatly to our knowledge of plant physiology, it does not appear that its practical applications will be adopted to any great extent in the agricultural world, except in those countries where an advance of even a few days in the date of harvest is an important consideration. As regards photoperiodism, although much remains to be learnt about it, the process has already had considerable application in horticulture, and is likely to be increasingly applied as electric lighting apparatus improves. The book holds out the hope that further research may give us a clearer understanding of the reciprocal influences between photoperiodism and temperature, and that this information will prove of increasing importance in agricultural and horticultural practice. The volume is well documented. A.G.G.H.

3107. NEDERLANDSE ALGEMENE KEURINGSDIENST VOOR GROENTEZADEN (N.A.K.G.). 631.531(492)
Teeltafbakening in Nederland. **(Seed production areas in Holland delimited and mapped.)**
N.A.K.G., The Hague, 1942 and subsequent years, 8 areas mapped.

This publication includes an explanation of the "Soil-production Cross-pollination Decree of 1942" and shows with maps the districts into which certain areas are divided in the scheme.

The aim of the decrees is to maintain as far as possible the

purity of certain stocks raised for seed, by fixing the boundaries of areas within which certain "preference crops" are grown, and so to ensure that no variety that might cause cross-fertilization is within certain fixed distances from the "preference crop".
The explanations concern chiefly: 1. Districts, preference plants and distances. 2. Culture of crops in a district where another crop is indicated as preference crop. 3. Cultivation in a boundary strip.

3108. PERROT, E. 633.88
*La culture des plantes médicinales.** **(The cultivation of medicinal plants.)**
Presses Universitaires, Paris, 1947, pp. 382, bibl. in text, price in England, 1948, 10s. 6d.
This book is a companion to four volumes of plates already published under the title "Plantes médicinales de France", and in the descriptive section references to the illustrations are given. The first part deals in general terms with cultivation, propagation, soils, manures and composts, harvesting and drying of wild and cultivated medicinal plants. In the second part descriptive notes on the botany and cultivation of a wide range of plants are given. These are arranged in alphabetical order under common names, but botanical names are included in the index.

3109. RAWITSCHER, G. 634.1/8(494)
Les sources de rendement des cultures fruitiéres. **(Factors determining orchard yields.)**
F. Rouge, Lausanne; Dunod, Paris, 1945, pp. 188, bibl. 43 [received 1948].
This volume is the outcome of observations and measurements made by the author in Valais during two years spent at the Châteauneuf School of Agriculture, Switzerland. Physiological factors affecting yield are discussed in the first seven chapters. Perhaps the most provocative is that dealing with suction pressure. It is suggested that differences in the suction pressure of stock and scion may be responsible not only for the more outstanding examples of incompatibility, but also for some well-known effects of stocks on scion; although examples quoted are based on determinations published by workers elsewhere, some are supported by the behaviour of apple trees growing in Valais. Other physiological problems discussed include biennial bearing, fruit drop, the relation of yield to crown volume and vigour, and the effect of vigour (with stocks differing in suction pressure) on fruit quality.
Economic problems are discussed in the second part of the book, with one eye on the methods of the American agricultural economist. The lack of co-operation among local growers is deplored because it deprives the research worker of data on which he could make constructive proposals; with co-operation it should be possible to make fruit growing in Valais as profitable as in the United States, without lowering the excellent quality of the product.

3110. SCHUPHAN, W. 635.1/7
Gemüsebau auf ernährungswissenschaftlicher Grundlage. **(Vegetable growing on a nutritional basis.)†**
H. A. Keune-Verlag, Hamburg, 1948, pp. 368, bibl. 178, illus., DM. 28.
In this happy synthesis of horticultural and nutritional science the author develops a new, important theory for the evaluation of vegetable yields and supplies all the data necessary on which to base practical conclusions. Applied on a national scale—and this is just what the author envisages—his theory would bring about a revolution in vegetable growing. The book should certainly be in the hands of all those who are concerned with the planning of vegetable cultivation in times of emergency.
When food is short, the aim of the vegetable grower should be to utilize the land to the best advantage in the national interest, i.e. to produce a succession of crops which will yield the highest food value from a given area within a given time. The two outstanding features of this book are (1) that it provides us with a standard measure which makes it possible to compare the food and health value produced by different crops per unit area per month, viz. the so-called *monthly production value* (monatlicher Leistungswert); and (2) that it emphasizes the necessity for comparing with each other not individual crops but individual crop *successions* grown on a given piece of land within a year.
Numerous tables give data of vegetable composition, but for purposes of comparison valuation is chiefly based on constituents which are generally present, namely calories, pure protein, vitamin C and provitamin A. By multiplying these figures, on which incidentally he bases his so-called *biological value* [food and health value=biologischer Wert] with figures for average yield, the author obtains the *food value per unit area* (ernährungswirtschaftlicher Wert) in calories, protein and vitamins. By dividing the food value per unit area by the number of months in which a crop occupies the land he arrives at the monthly production value. From the table we see, for instance, that summer spinach yields 374 kg. pure protein per month as compared with wheat, 42 kg.
It is of special interest that the author carries his point further and applies his method of evaluation to a comparison of the nutritional merits of different crop successions. He distinguishes in vegetable growing between 4 degrees of intensity, tabulating for each group the food value per hectare of a large number of successions. Highest calorie and protein yields were obtained in the category of unheated glasshouses. Attention is paid as well to the nutritional significance of producing a crop when it is most needed, especially at the time of vitamin shortage in spring.
Economic considerations other than the needs of the community lie outside the author's interest. Thus, only in one place does he mention that a regulation of prices according to the nutritional value of the vegetable might help the grower. His aim is to supply data which make it possible to determine easily the most profitable succession of crops in any given area. Incidentally he suggests that the monthly production value would be a useful concept in variety testing and in breeding.
It should be finally noted that the numerous data presented are largely the author's own results and that the book, apart from introducing new ideas in a forceful manner, is an extremely valuable source of reference to the food scientist.

3111. SHEWELL-COOPER, W. E. 634+635
Gardening.
Reason Why series, Herbert Jenkins, London, 1948, pp. 182, illus., 7s. 6d.
The first book of this nature which the reviewer encountered some thirty-five years ago was entitled *Palaestra Logica* and was thought by many simple-minded undergraduates, himself included, to afford the golden and easy road to a knowledge of logic. Perhaps its aim was just to catch "flats", and in that it amply succeeded. But it certainly did not teach one logic. Nor, can it be supposed, does the author of *Gardening* suggest for a moment that anyone should try to learn gardening from this book.
That it will have a certain vogue and will give great pleasure to those addicted to horticultural Brains Trusts is quite certain, since it is written in easy colloquial style and does undoubtedly afford a great deal of interesting, though necessarily incomplete, information on many day-to-day gardening questions. We see no reason why there should not be a whole series entitled Gardening II, III, etc., containing each time fresh questions just as felicitously answered as in vol. I. As bedside books they would be unrivalled even by mythical sheep going through gaps and, if only one could ever remember the answers, much more elevating.
D.A.

* Noted *H.A.*, 18: 1285c.
† See also 2663, 2664.

3112. SHOEMAKER, J. S. 634.7
Small fruit culture.
The Blakiston Co., Philadelphia, 1948, 2nd edit., pp. 433, bibl. 536, illus., $4.00.

This is "a text for instruction and reference work and a guide for field practice". We might add that garden practice is also included, and that the author deals with small fruit growing throughout the United States and Canada. The following crops are considered: grapes (pp. 114), strawberries (pp. 103), bramble-fruits (pp. 104), currants and gooseberries (pp. 18), blueberries (pp. 34), and cranberries (pp. 31). As in his recent book on vegetable growing (see *H.A.*, 18: 1525), the author has assembled in a convenient form much information from bulletins of the agricultural experiment stations, from the *Proceedings of the American Society for Horticultural Science*, from personal correspondence and from his own experience. The distribution of commercial cultivation of each crop is described. An account of the history and characteristics of the varieties is followed by sections dealing with soils, planting, cultivation, pruning and training, flower bud formation, irrigation and drainage, manures and fertilizers, harvesting and marketing, costs of production, and the control of pests and diseases. The influence of climate on small fruit growing is stressed throughout, and a considerable amount of attention is devoted to the prevention of winter injury and of frost damage in spring and autumn. There is a particularly interesting section on hardiness and winter injury of the red raspberry, in which varietal differences in susceptibility to such damage are associated with differences in the rest period required by the varieties concerned. The relative value of some results of experiments of limited local application is indicated by their being set in smaller type. Local terms—in Wisconsin a cranberry bog is usually called a marsh—and practices are explained clearly, a fact which enhances the value of the book to growers and students outside North America.

G.K.G.C.

3113. SIMONS, A. J. 635.1/7
The vegetable grower's handbook.
Penguin Books Ltd., West Drayton, Middlesex, being *Penguin Handbook* PH7, 1948, pp. 416, 2s.

This is a revision in the light of comments and experience and in a single volume, of the two admirable volumes published in 1945 (see *H.A.*, 15: 2068). It is a practical book for practical men and should be in the hands of beginners and old stagers alike.

3114. STAMP, L. D. 63(42)
The land of Britain and its use and misuse.
Longmans, Green, London, 1948, pp. 507, 42s.

This impressive book is intended to serve a dual purpose. In the first place it includes a summary of the work and findings of the field-to-field survey of land used in Britain carried out by the Land Utilization Survey mainly between 1931 and 1934. In the second place it attempts the more difficult task of analysing those findings and so of evaluating the various factors which have determined the complex and intricate pattern of rural Britain. Though their relative importance may change with the years, the influence of those factors persists, and they will as inevitably shape the pattern of future Britain as they have the pattern of the Britain of to-day and yesterday. In this description and evaluation of the national resources of land—part of a national stocktaking—the emphasis is on the lessons which the past, especially the immediate past of 1931-38, may have for the future. While the main emphasis of the book is on agriculture, certain sections of it are devoted to horticulture, e.g. Chapter VI, Distribution of orchards, and Chapter VII, Market gardens and glasshouses.

3115. TAYLOR, G. M. 635.9
The little garden.
Collins, London, 1948, pp. 256, illus., 8s. 6d.

The book is almost entirely devoted to the recommendation of suitable subjects for the enthusiastic beginner who wants only good varieties, including a few rarities. The pleasure garden is the main theme, with 42 pages on fruit and an odd paragraph on mint tacked on. Vegetables are not included, and there is nothing on planning. The only gardening operations described are compost making and raising plants from seed. The photographic plates are clear and add to the value of the book, those showing views of "little gardens" suggesting that the author has in mind the garden of ¾ acre and upwards.

Surprisingly enough, in a book which is largely conventional, the author advocates dispensing altogether with the lawn on the grounds that the upkeep is far too much trouble. But whether one calls this feature a "lawn" or a "bit of well-kept grass", few amateurs could imagine a garden without one, and actually the labour involved in keeping it in order in a "little garden" is not inordinate, especially since the advent of the hormone weedkillers, of which, incidentally, no mention is made. The suggestion of an Elizabethan camomile lawn is intriguing.

3116. ARIZONA. 633/635(791)
Fifty-eighth Annual Report of the Arizona Agricultural Experiment Station for the year ending June 30, 1947, 1948, pp. 43.

The report includes the following items of horticultural interest: An *apple* orchard in a serious state of decline was found to be located over an impermeable hardpan. The trees recovered completely within a year after the hardpan had been broken up with dynamite. *Weed control.* Reductions in the stand of nutgrass of 85-95% were effected by 2-3 applications of 2,4-D at 0·2-0·3%. Burroweed, *Haplopappus tenuisectus*, was found to require more drastic treatment than other field weeds. *Vegetables.* Tomato plants grown in the open needed about 8 weeks to be ready for shipment to Indiana if planted the beginning of March, but only 6-7 weeks if planted the middle or second half of the month. The breeding work on lettuce continues. In cantaloupe variety trials Arizona 45, a selection for uniformity and productivity of the mildew-resistant 45, gave promising results. The work on quality improvement is carried on. *Citrus.* An oil [Diesel] spray programme for controlling weeds in orange groves has been in operation since the summer of 1944. The work is here discussed and its favourable effects on yield, quality and resistance to winter freezing in oranges noted. Grapefruit quality was unfavourably affected. 2,4-D was found to be toxic to citrus. Data are presented on the relation of starch storage in grapefruit trees to seasonal temperature. The larger, fleshy roots are the most efficient storage organs. A high level of nitrogen-nutrition was shown to be associated with a higher concentration of starch and to result in a more complete utilization of stored root-starch in the actively growing parts of the tree. The proper timing of nitrogen applications coupled with the removal of excess nitrogen by cover crops continued to induce early fruit maturity in young grapefruit trees. On the basis of experimental evidence recommendations are made for the most efficient citrus irrigation schedule for an allocation of 2 acre-feet of water. A study of chlorosis in citrus trees growing on calcareous soils confirmed the suggestion that the trouble is due to lack of iron utilization within the plant rather than to a failure to take up iron or other micro-elements from the soil. To a limited extent control of this type of chlorosis can be accomplished slowly by applying sulphur-manure mixtures. *Amino acid contents* of fruits and vegetables. A satisfactory method was developed for the hydrolysis of vegetable products for the determination of tryptophane. Besides being a constituent of proteins tryptophane is important for the prevention of pellagra. It is comparatively abundant in broccoli and cauliflower and low in carrots. *Pathology.* Watery brown rot of lettuce, caused by *Sclerotinia sclerotiorum*, was markedly reduced by applications of granular calcium cyanamide (900 lb./acre) to

soil inoculated with the fungus. Citrus dry root rot infections responded favourably to applications of manure, sulphur and ammonium sulphate in basins around the affected trees.

3117. BARBADOS. 633.61(729.86)
Annual Report, Department of Science and Agriculture, Barbados, 1946-47, pp. 83.

Sugar-cane breeding A list of crosses made and seedlings raised during the year is given, together with reports on the progress made in the testing of the B.41′ to B.48′ series. Seedlings of certain series were tested for mosaic resistance by the Sein method, under trial for some years, but the "take" was unsatisfactory. The variety B.37161 accounted for almost 84% of the sugar-cane reaped in the island during the 1947 season. This seedling, a 3rd-nobilized *Saccharum barberi*, is vigorous, fairly drought-resistant, suitable for all ecological areas of the island, and has a juice of very high purity. Unfortunately it trashes badly and so is difficult to clean for milling. *Chemistry:* The results of manurial trials and of developments in sugar-cane agronomy are reported. *Entomology:* The control of the main pest of sugar-cane, *Diatraea saccharalis*, was maintained by timed liberations of the egg parasite, *Trichogramma minutum*, of which over 491 million were bred during the year. Work on the relation between borer damage and variety in sugar-cane continues. Seven years of experiments have shown that the scarabee (*Euscepes postfasciatus*) of sweet potato can be controlled by three timed sprayings with lead arsenate. The same spray programme also controls thrips (*Dendrothripoides ipomoea*), and the army worm (*Xylomyges eridania*). It also reduces infestation by the leaf hopper (*Empoasca fabalis*) which appears to be increasing greatly.

3118. BIBLIOTHEK DER HOCHSCHULE FÜR BODENKULTUR, WIEN. 633/635: 016
Das Schrifttum der Bodenkultur. **(Soil science literature.)**
Österreichischer Fachzeitschriftenverlag, 1948, Vol. 1, No. 1, pp. 36, 6 months' subscription (3 numbers), Swiss francs 7.

The journal reviews books and notes articles relating to all branches of agriculture, horticulture, silviculture and the food products industries. The aims of new periodicals are set out and a selective list of new acquisitions of the College library is appended. Though primarily published for the benefit of Austrian and German readers, the journal will be of value to the foreign scientist who wants to keep abreast of developments in central Europe.

3119. CAMPDEN. 664.85.036.5 + 664.84.036.5
Annual Report of the Fruit and Vegetable Preservation Research Station, Campden, for 1947, 1948, pp. 59.

The bulk of this report is devoted to articles on particular research projects. Abstracts from these appear elsewhere in this number. The progress of research touching on the following subjects is briefly reviewed: quality in canned fruit and peas and in quick-frozen fruit and vegetables, vitamin C in blackcurrant pulp, electrotinned plate for vegetable cans, effect of incubation on pH of canned vegetables, internal rusting of cans.

3120. CANADA. 63(71)
Reports of the Science Service, Dominion of Canada Department of Agriculture, for the years ended March 31, 1946, 1947, pp. 91, and *March 31, 1947*, 1948, pp. 108.

For abstracts of the Reports of the Minister of Agriculture for the same periods, from which these reports were reprinted see *H.A.*, 17: 1096 and 18: 1533. The Divisions of the Science Service report are enumerated in *H.A.*, 16: 1705.

3121. CAWTHRON. 633/635(931)
Annual Report of the Cawthron Institute 1947-48, 1948, 38 pp.

Plant Nutrition Investigations. Leaves and apples of Dougherty and Sturmer trees showing symptoms of deficiency of N, P and K were analysed for these elements and Mg. The amounts present were found to be affected by soil and fertilizers. Iron deficiency occurred in Delicious trees when nearby trees of Sturmer and Granny Smith were unaffected. Analyses of tomato leaves and fruits showed that "Cloud" is not associated with abnormal amounts of Fe or Mn. *Fruit Research.* The effect of magnesium applications on the Mg content of apple leaves is considerable, but the effect on the fruits is slight. Analysis of pips of Jonathan and Sturmer apples did not give a reliable indication of the Mg status of the trees. In orchards where apples exhibit Mg deficiency trees that have been limed now show some improvement over controls; leaves from the limed trees contained 15% more Mg than those from the controls. In the Tasman and Braeburn districts little improvement has been shown by trees sprayed with zinc and manganese, but at Blenheim this treatment appears to do good. Sets of soil samples, collected in 1932, 1940 and 1946 from the Sturmer manurial block at the Appleby Research Orchard, have been analysed. In the untreated plots available P and K have markedly decreased since the experiment began. In plots dressed with superphosphate large increases in available P have occurred in the top 6 in. of soil. Available K and N have been increased in the top 12 in. by application of the appropriate fertilizer. Exchangeable Mg has decreased, particularly where N and K fertilizers have been applied. Manurial trials with raspberries have shown the importance of N and K. At Rakau borax was beneficial. *Tomato Research.* Work on soil disinfectants was extended to include D-D and 666. Tomatoes of good quality were obtained where D-D had been used. In the early stages 666 gave good results, but the outcome was disappointing. Tests of soil amendments for tomatoes continue to show the benefits of compost, cocoa bean husks and sawdust. The yields of several tomato varieties grown under glass were compared; Mayland Beauty, E.S.1 and E.S.5 were less susceptible to "cloud" and produced a greater proportion of high grade fruit than other varieties. Further studies of "cloud" and "hard-core" have been made. *Tobacco Research.* Chemical studies stress the importance, in flue-curing tobacco, of allowing the leaf to colour fully before raising the temperature to dry it out. The variety Little Dutch showed marked resistance to black root rot in the seedbed. Chloropicrin, used at 6 c.c. per sq. ft., gave good control of this disease. The source of infection appears to be the sand used for top-dressing the seed-beds. *Hop Research.* At the request of the Hop Research Committee, surveys have been made of hop gardens to ascertain the extent and nature of root diseases. *Phytophthora* sp., *Verticillium* sp., and *Fusarium* sp. have been identified on diseased roots. *Entomological Investigations.* Arrangements are being made to form an Entomological Research Station by combining the entomological resources of the Institute and of the D.S.I.R.

3122. CERES. 635 + 634(4)
Ceres, Hamburg, Blätter für fortschrittlichen Gemüse- und Obstbau. **(Research notes on vegetable and fruit growing.)** 1948, Vol. 1, No. 1, pp. 18, H. A. Keune-Verlag, Hamburg 1, RM. 1.25 per number excl. postage.

The aim of this new journal for "progressive vegetable and fruit growing" is to keep the grower informed on the latest scientific developments that have a practical application in horticulture. While according to this programme purely scientific papers are excluded, the standard of the contributions would appear to be high, as testified by the first 6 numbers received.

3123. CEYLON. 633/635(548)
Administration Report of the Acting Director of Agriculture, Ceylon, for 1946, Pt. IV, Education, Science, and Art (D), 1948, pp. 88, Re. 1.90.

Experiment and investigation. *Coconuts:* Approximately

2¼ million *Eulophid* parasites were liberated on estates infested with the coconut caterpillar. This pest was completely controlled in all areas except three. One new infestation occurred. *Pyrethrum:* The pyrethrin content of Japanese, Kenya and Ceylon (1·18-1·44%) flowers is compared. An average yield of 204 lb. per acre of dried flowers is reported from the Pyrethrum Station. Selection for pyrethrum content was undertaken. A disease characterized by premature dying of buds and flowers was investigated and the fungus *Coniothyrium* isolated from diseased material. *Cinchona:* The results of an investigation (factorial design) into the factors influencing root formation and trials of frame working and bark grafting are reported. *Horticulture:* The results of stock-scion trials with citrus, mango, avocado, sapodilla, and rambutan are briefly recorded. Amongst successful clonal selections made were: a seedless Bibile sweet orange, a large-fruited sapodilla, and a seedless guava. Improvements in technique [not described] now make it possible to produce a grafted mango in a year. *Tobacco:* Manure, rotation, and variety trials are reported. *Sugar-cane:* Co.349 gave significantly higher yields than all other varieties tested, but is susceptible to borer.

3124. CEYLON. 634.61(548)
Annual Report Coconut Research Scheme, Ceylon, for 1946, 1948, pp. 21, 45 cents.
The report contains brief summaries of work on: sugars in coconut water, composition of coconut "apples", meat of immature nuts, density of coconut oil, sundry coconut products, seedling selections and trials, yield trials, dwarf palms, manurial trials, and comparison of plants from 1st and 2nd bunch nuts.

3125. C.S.I.R. AUSTRALIA. 633/635+664.84/85(94)
Twenty-first Annual Report, Council for Scientific and Industrial Research, Australia, for the year ending 30 June, 1947, 1948, pp. 139, 6s.
The following items have been selected from this comprehensive report: *Weeds:* Some results from trials of growth substances and other herbicides on numerous weeds are reported. An improved form of the apparatus for determining death of plant tissues is announced. *Plant introductions:* There is now a well-placed chain of preliminary testing stations for regional trials of promising introductions. Numerous plant introductions are reported, including varieties of guar (*Cyamopsis tetragonoloba*). *Fruit:* A local apple rootstock, No. 54, gave better results in a nursery trial than Spy. Jonathan apples grow more strongly on Merton 778 and 779 stocks and on Zuccamaglio Reinette than on Spy. *Drug plants:* The study of *Duboisia* species and the search for sources of pharmacological and insecticidal substances in native plants continued. *Potatoes:* The attempt to combine resistance to potato viruses A, X, Y, and leaf roll in hybrids of good agronomic qualities continued. Studies of resistance to spotted wilt, common scab, *Rhizoctonia* scab, *Fusarium* wilt, early and late blight are in progress. *Tomatoes:* A study of the factors affecting *Fusarium* wilt resistance in the variety Pan America and of resistant hybrids from it is reported; also a project to develop resistance to early blight. *Peas and beans:* A project to develop a pea of the Greenfeast type with resistance to *Ascochyta pisi* is recorded. Work on beans was mainly concentrated on obtaining resistance to Halo and common American blight. *Biological control:* The introduced insect enemies of St. John's Wort continued to clear land of this weed. The breeding and distribution of parasites of the potato moth, *Gnorimoschema operculella*, and the introduction of Ichneumonid parasites of the cabbage moth were undertaken. *Orchard pests:* Investigations into the control of the oriental peach moth, the codling moth, the red spider and the red mite continued. Dicyclohexylamine dinitrocyclohexylphenate, incorporated in two DDT cover sprays against codling moth, controlled red mite but not red spider. Hexaethyl tetraphosphate (HETP) gave a complete kill of red mite and red spider, but did not prevent reinfestation by the spider. *Guayule rubber:* Investigations into growth and rubber content are reported. Under favourable conditions experimental plants of 4 to 4½ years, grown from U.S.A. seed, and receiving 3 irrigations per summer, showed 7-8% rubber, or 77 grams per plant, corresponding to 830 lb. rubber per acre.

3126. CYPRUS. 633/635(393)
Annual Report of Department of Agriculture, Cyprus, 1947, 1948, pp. 11, 2s.
Deciduous fruits: Long-established trials having shown what varieties are suitable for the higher altitudes, attention is now being directed towards finding suitable varieties for the plains and foothills. *Citrus:* Attention was concentrated on the production of grafted seedlings of early and late varieties. *Seed production:* The production of vegetable seeds for export continued to expand, the principal items being cauliflower and broccoli seed, the average yield of which was approx. 270 lb. of clean seed per acre. Interest was also shown in flower seed production. *Tobacco:* Virginia tobacco has been reported as unsuitable for local conditions. *Potatoes:* Trials are reported. Up-to-Date continues to be the outstanding variety in the island.

3127. EAST MALLING. 634.1/7+633.79
Annual Report of East Malling Research Station for 1947, 1948, **A31**, pp. 194, 27 plates, 10s.
This report, as in past years, consists of four parts. I. The Experimental Farm, with notes on yields from the various plots, an account of the routine spray programme, and hop valuations of the 1947 growth. II. General review of research work, with lists of papers published during the year. III. Research reports and reviews, including the text of the first Amos Memorial Lecture. IV. Bulletins for fruit growers. [For papers in Parts III and IV, see separate abstracts.]

3128. GOLD COAST COLONY. 633.74+634.3(667)
Report on the Department of Agriculture, Gold Coast Colony, for the year 1946-47, 1948, pp. 16, 1s.
Cacao. Swollen shoot disease continues to be the main preoccupation; it is pointed out that the economic effect of the continued decline in production is masked by a continuous and rapid rise in the price of cocoa. *Citrus.* During the year the cause of decline in lime plantations was investigated by an expert from the West Indies, whose conclusions and recommendations are summarized, and by a pathologist appointed for the purpose; it is suggested that rough lemon should be used as stock and that an attempt should be made to supply trace element deficiencies, symptoms of which are generally evident. Detailed reports of work in progress in the administrative divisions are given.

3129. GOLD COAST, DIRECTOR OF AGRICULTURE. 633.74: 632.8(667)
Gold Coast Cocoa Survey and Swollen Shoot campaign. *First interim report*, April-September, 1946, pp. 9.
IBID.
Cocoa disease control and rehabilitation—Gold Coast. *Second interim report*, October, 1946, to March, 1947, pp. 8. *Third interim report*, April-September, 1947, pp. 6. *Fourth interim report*, October, 1947, to March, 1948, pp. 6 [stencilled].
An account is given of the progress of the survey of cacao farms in the Gold Coast. The main objects of the survey are to secure information of assistance in controlling swollen shoot and to persuade farmers to replant in treated areas suitable for continued cacao cultivation. The rehabilitation programme includes the establishment of experimental plots throughout the cacao area and the assistance of farmers to replant where diseased trees have

been removed. Cutting out diseased trees, the only method of control available, was suspended during the period covered by the fourth report, owing to the opposition of the peasant farmers.

3130. GULVAL. 635.1/9
Growers notes and *Gulval Experimental Station Record, 1947*, 1948, pp. 23. N.A.A.S., S.W. Prov.—Minist. Agric. Lond.

Growers' notes: Information and advice is given on protected cultivation by Dutch lights and cloches, soil management and successional cropping under lights and cloches, strip cropping, kinds and varieties of vegetables for continuous cloche and cold frame culture in the different seasons. Under flower and bulb production advice is given on choice of land, rotations, planting stocks, storage and pre-planting treatment of bulbs, cultivation, weed control, hygiene, roguing and marketing. *Gulval Exp. Stat., Cornwall:* The results from experiments on electric soil warming for French beans and on the effect of storage temperature on the growth and flowering of daffodils are tabulated. King Alfred daffodils from bulbs stored at 42° F. for 42 days from 30 August came into full bloom on 5 March, or 21 days earlier than the untreated controls. There are notes and suggestions on the storage of tulip and daffodil bulbs, based on work done in Holland, Lincoln, and Cornwall.

3131. IDAHO. 635.1/9(796)
54th Annual Report of the Idaho Agricultural Experiment Station for the year ending June 30th 1947, 1947, pp. 50, being *Bull. Idaho agric. Exp. Stat.* **269.**

Items of horticultural interest in this report include notes on the use of 2,4-D as a weedkiller, and oil sprays for weeding onions. Spring-planted carrot roots produced nearly ten times as much seed as did roots planted in the autumn. Trials at Moscow indicate that parts of northern Idaho may be suitable for the commercial production of flower and vegetable seed. Breeding work continues with tomatoes; inter-specific crosses have been made with the object of securing resistance to curly top. Of materials tested for the control of onion thrips, 666, DDT, tartar emetic and chlordane showed most promise. Research on potatoes included efforts to control the potato root nematode and various diseases caused by fungi; the production of bottle-neck tubers appears to be caused by shortage of moisture when the tubers begin to form.

3132. IMPERIAL COLLEGE OF TROPICAL AGRICULTURE. 633/635(729)
Report of the Governing Body and the Principal's Report for 1947, St. Augustine, Trinidad, and Grand Buildings, Trafalgar Square, London, W.C.2, 1948, pp. 42.

The expansion of the college continues: four research schemes on soils, sugar, cacao and bananas, now come under its aegis, and 300 acres of land have been leased for the development of a new farm. Much of the work of the departments has already been noted from scientific papers. *Zoology and Entomology.* Experiments have been made on the transmission of cacao virus by insect vectors. Parasites of the sugar-cane-stalk borer *Diatraea* spp. have been shipped to Mauritius for trial against borers of the genus *Proceras. Sugar Technology.* In the laboratory, the substitution, by means of ion-exchange resins, of sodium for calcium in clarified juice was more expensive than scaling the evaporator, which it obviated. Bagasse was destructively distilled on a small scale, yielding carbon, a distillate like tar, and combustible gas.

3133. INDIAN TEA ASSOCIATION. 633.72
Proceedings Sixth Annual Conference of the Indian Tea Association held at Tocklai Experimental Station, 1948, pp. 51 +appendices 39.

Appendices 1 to 4 to these proceedings concern: past, present, and future work on plant protection; field experiments with tea; tea breeding and botanical programme, 1948; biochemical work on tea.

3134. INDISCH INSTITUUT, AMSTERDAM. 016: 63: 551.566.1
Documentatie van de Afdeling Tropische Producten van het Indisch Instituut te Amsterdam betreffende tropische en subtropische landen. **(A journal of abstracts on tropical agriculture.)** 1948, No. 12, 12 June, pp. 289-312.

Attention is drawn to this Dutch periodical which gives brief, indicative abstracts covering the fields of economics, trade, transport, mining and agriculture, as affecting tropical and subtropical territories. In this issue half the space is occupied by agricultural items, largely concerning crops dealt with in *Horticultural Abstracts*; about half of these are noted from periodicals perused regularly at this Bureau. The abstracts are arranged in order under the Universal Decimal System.

3135. INSTITUT NATIONAL AGRONOMIQUE. 63(44)
Annales de l'Institut National Agronomique, Paris, 1947, Paris, 1947, **34**: 1-221 [published 1948].

Publication of this journal ceased in 1942. It has now been resumed, the intention being that two or three parts should be issued annually to make a volume of 200 to 250 pages. Only original papers are to be published, covering the results of research work carried out at the Institute, or by former pupils, and reports of study tours. Books dealing with agronomy will be reviewed.

3136. XIITH INTERNATIONAL HORTICULTURAL CONGRESS. 633 +634 +635
Proceedings of the Twelfth International Horticultural Congress, Berlin, 1938, 2 Vols., pp. 1,555.

A belated copy of the *Proceedings of the Twelfth International Horticultural Congress*, held in Berlin in 1938 and published there in 1939, has just come to hand† in this country. In spite of the long delay, we consider it useful, in the interest of bibliographical completeness, to note at least the authors and titles of the more important papers presented at the conference. The report is arranged in 20 sections, most of them with an extensive bibliography appended. As on earlier occasions, one or more so-called general reporters had been nominated for each section to give a survey of their subject based on the reports from individual participating countries. Where not otherwise indicated the language of the paper is English.

Section 1: Fruitgrowing, pp. 7-56.

Kobel, F.* Modern research on the pollination of fruit trees and its application in fruit growing. (German), pp. 7-14.

Eleven other reports.

Section 2: Vegetable growing, pp. 57-126.

Guzzini, D. The significance of location for the development of horticulture. (Italian), pp. 57-65.

Truninger, E.* The adaptability of agricultural experimental methods to practical vegetable growing. (German), pp. 66-73.

Gorski, M.* Manurial problems in vegetable growing. (German), pp. 74-80.

Fifteen other reports.

Section 3: Flowers and ornamental plants, pp. 127-258.

Durham, F. R. The object and purpose of exhibitions and trials of new varieties in regard of the advancement of horticultural breeding, pp. 127-34.

Steffen, A.* The general object of breeding flowers and ornamental plants, with special reference to their market value. (German), pp. 134-42.

Ruys, B. Shrubs. (German), pp. 142-5.

† By the courtesy of Prof. E. Kemmer of Berlin-Dahlem. Copies are unobtainable through normal channels.

* General Reporter.

Beijer, J. J. Flower bulbs. (German), pp. 146-9.
Chaubert, R. Garden flowers. (French), pp. 149-50.
Rusconi, A. Cut flowers. (Italian), pp. 151-5.
de Bruyker, L. Pot plants. (French), pp. 155-64.
Twenty-six other reports
Section 4: Horticultural seed growing, pp. 259-302.
Franck, W. J. Stimulation of seed breeding and of exchange of seeds by international agreement in the seed inspection, pp. 259-67.
Göhrn, C.* Horticultural seed growing. (German), pp. 267-78.
Eight other reports.
Section 5: Nurseries, pp. 303-64.
Jansz, K. The application of scientific results to the raising of nursery trees. (German), pp. 303-8.
Hatton, R. G.* The present status of research on rootstock plants and the use of rootstock plants, pp. 309-18.
Twelve other reports.
Section 6: Tropical and subtropical fruitgrowing, pp. 365-448.
Calvino, M.* The progress of fruitgrowing in tropical and subtropical countries and its significance there and in some countries of the temperate zone. (Italian), pp. 365-72.
Nineteen other reports.
Section 7: Nomenclature, pp. 449-60.
Section 7a: Colour charts, pp. 461-70.
Section 8: Plant protection, pp. 471-574.
Trouvelot, B. Biological pest control. (French), pp. 471-7.
Martin, H.* Status of the application of poisonous plant protective substances, pp. 477-88.
Stellwaag, F. Possibilities of substituting non-poisonous for poisonous plant protectants in horticulture and experiments in this field. (German), pp. 488-94.
Twenty-three other reports.
Section 9: Spice, scent and medicinal plants, pp. 575-656.
Flück, H.* The influence of natural conditions on medicinal plants. (German), pp. 575-85.
Dafert, O.* The influence of cultural conditions on medicinal plants. (German), pp. 585-94.
de Graaff, W. C.* Preparation and standardization of spice, scent and medicinal plants. (German), pp. 594-9.
Fourteen other reports.
Section 10: Fruit and vegetable storage, pp. 657-756.
Eaves, C. A. Physiological disorders of stored apples in Canada, pp. 657-63.
Rasmussen, L.* Losses in fruit and vegetable storage and their control, pp. 663-4.
Twenty other reports.
Section 11: The processing of fruits and vegetables, pp. 757-832.
Charley, V. L. S.* Fruit beverages, pp. 757-66.
Nehring, E.* Fruit and vegetable canning. (German), pp. 766-76.
Seventeen other reports.
Section 12: Fruits and vegetables in nutrition and medicine, pp. 833-930.
Wirz, F. The importance of fruits and vegetables to the health of the nation. (German), pp. 833-8.
Baglioni, S.* Fruits and vegetables in nutrition. (Italian), pp. 839-45.
Stanley, L.* The importance of fruits and vegetables in human nutrition, pp. 845-9.
Sixteen other reports.
Section 13a: Small gardens, pp. 931-48.
Knoll, —. The importance of the garden for the townsman. (German), pp. 931-6.
Förster, H.* The importance of small gardens for townsmen. (German), pp. 936-44.
Section 13b: The small settlement, pp. 949-1002.
Ormos, J.* The importance of settlement and home gardens for the townsman. (German), pp. 949-56.
Fourteen other reports.

* General Reporter.

Section 14: Garden planning, pp. 1003-70.
Jensen, J. Park and garden planning, pp. 1003-12.
Hermelin, A.* Green belt areas in towns and their healthful effect. (German), pp. 1013-9.
Mertens, W.* Landscape gardening in the countryside. (German), pp. 1020-8.
Eight other reports.
Section 15: Education, pp. 1071-1169.
Ignatius, J. G. W.* The development of horticultural schools and its relation to the development of horticulture in individual countries. (German), pp. 1071-39.
Turbate, E.* The exchange of young gardeners. (French), pp. 1092-3.
Twenty-eight other reports.
Section 16: Production and marketing regulations, pp. 1170-1216.
Boettner, J. Marketing regulations in horticulture. (German), pp. 1170-5.
Marozzi, A.* The bases of the enforcement of market regulations. (Italian), pp. 1175-6.
Eight other reports.
Section 17: Special plant-physiological problems, pp. 1217-1310.
Tincker, M. A. H.* The present state of research on growth promoting substances and its applicability to horticulture, pp. 1217-28.
Thirteen other reports.
Section 18: Mechanization in horticulture, pp. 1311-92.
Mathieu, G.* Mechanization in horticulture in relation to size and character of the business. (French), pp. 1311-24.
Eighteen other reports.
Section 19: Flower decoration and flower sales, pp. 1393-1444.
Kolbrand, F.* National characteristics in flower decoration. (German), pp. 1393-1406.
Perotti, O.* The flower trade and its economic importance. (Italian), pp. 1406-10.
Eleven other reports.
Section 20: Insurance problems in horticulture, pp. 1445-1506.
Manicardi, C.* National reports and replies to questionnaires on the problems of insurance in horticulture. (Italian), pp. 1446-54.
Engel, H.* Insurance problems in horticulture. (German), pp. 1454-9.
Eighteen other reports.

3137. Iowa. 633/635(777)
Report on Agricultural Research, Iowa Agricultural Experiment Station, for year ending June 30, 1947, Part 1, pp. 299.

Of the many projects reported, the following, amongst others, are of interest to horticulturists: the development of new rootstocks for apples; influence of stock on scion (apples); a comparison of old and new apple varieties; the planting of apple trees with reference to soil erosion terraces; effect of ripening, storage, etc., on vitamin C in apples; bionomics and control of codling moth and apple maggot; physiology and storage responses of fruit to treatment, including gas storage; soil management studies in orchards; apple, pear and plum breeding; variety studies with peaches; hybridizing black raspberries; study of rootstocks and intermediate stem pieces for tree fruits; potato and onion breeding; vegetable variety studies; the improvement of tomatoes, pumpkins and melons; factors affecting sprouting in sweet potatoes; production of essential oil from anise hyssop (*Lephanthus anisatus*); the study of new herbicides and their physiological action; study of sweet potato diseases; propagation of disease-free sweet potato stocks; study of seed disinfectants in control of disease; study of onion diseases; the testing of new potato hybrids for disease resistance.

* General Reporter.

3138. KENTUCKY. 63(769)
Fifty-ninth Annual Report of the Kentucky Agricultural Experiment Station for the year 1946, 1947, pp. 68.

Several pages of this report are devoted to reports of research on breeding, cultivation, fertilizing and harvesting tobacco. *Nicotiana rustica*, harvested green, produced from 124 to 133 lb. nicotine per acre at the Western Kentucky substation, Princeton. The performances of several new varieties of apple and other fruits are noted. Peach trees, pruned under different systems, produced a greater yield of smaller fruit in their eighth year than unpruned trees, which had lost interior fruiting wood by shading; in previous years the pruned trees had been the more fruitful.

3139. LAUSANNE. 634/635(494)
Rapport d'activité 1947 des stations d'essais viticoles, arboricoles et de chimie agricole, à Lausanne et a Pully. **(Annual Report of the Lausanne Horticultural Research Station 1947.)** Lausanne, 1948, being reprinted from *Landw. Jb. Schweiz*, 1948, **62**: 555-660.

Oenology: Subjects discussed include the preparation of non-fermented grape juice from direct producers; the addition of juice concentrates to grape must for the improvement of wines as an alternative to sugar; density measurements of must by the refractometer method; and the use of SO_2 in wine making. *Physiology and Mycology:* Bordeaux mixture (1%) was superior to cuprous oxide (0·5%) in checking the development of vine mildew, *Plasmopara viticola*. Lime-sulphur gave better control of apple scab than organic sulphur but caused scorching; wettable sulphur was as good as lime-sulphur against scab but failed to control red spider. A sulphur mixture consisting of lime-sulphur, iron sulphate and spreader proved effective against apple mildew, *Podosphaera leucotricha*, and caused no scorching. Organic and wettable sulphur reduced mildew in peach fruits, *Sphaerotheca pannosa*, from 30% to 9% and 10% respectively. After a 3-years' study of apricot decline in the Valais, conclusions on the nature of the disease and its possible prevention are formulated. The most notable symptom of the trouble is the blocking of the conducting vessels by gum, which in every case has its origin in a wound. The necrotic tissue is believed to form a toxic substance affecting cambium activity. Time of pruning had no influence on disease incidence, but the application of copper salts to pruning wounds proved very harmful. The trees should, therefore, not be treated with copper fungicides before the wounds are covered with a protective paint. 2,4-D favoured callus formation but also gumming. Oviposition by *Ceresa bubalus* was found to cause wounds, through which *Valsa* spp. enter, which in their turn precipitate the decline of the tree. Peach gummosis in connexion with *Monilia cinerea* and *M. fructigena* infection was also investigated. Premature autumn colouring of vine leaves following application of copper sprays was found to be related to the reduction in starch formation associated with a copper residue on the leaf. Electrical soil sterilization at 80-85° for 10-15 minutes proved superior to fungicidal soil treatment. No encouraging results were obtained by hormone spraying for the prolongation of dormancy in vine buds during the critical spring frost period. Hormone treatment may, however, be useful for checking flower drop in certain vine varieties. The herbicidal action of synthetic growth substances and their influence on cultivated plants were tested in further trials of the Department. *Entomology:* Trials are reported for the control of cochylis and eudemis in vine, of ermine moth (*Hyponomeuta padella*), of apple blossom weevil, of plum and pear sawfly, of codling moth and of San José scale. *Bacteriology:* Experiments are in progress which aim at the substitution of SO_2 by antibiotics for the protection of wines against bacterial and fungal infection. A study was made of the influence on fermentation of the copper compounds used in the control of vine diseases. Copper sulphate showed no significant effect, whereas cupric oxide was found to influence the fermentation process unfavourably. *Genetics:* Pollen germination of the vine variety Chasselas; vine breeding; peach breeding. *Viticulture:* The variety trials include European vines, direct-producers and table grape varieties. Although the results of rootstock trials in difficult localities are fully tabulated, final conclusions will be possible only at the end of the experimental period when longevity will be another factor considered. *Pomology:* A progress report on peach rootstock trials is followed by data on Malling rootstocks. It was found that the vigour of M. I and II is strongly influenced by the scion. Cold storage and the Krebser cellar were compared in apple storage trials. *Frost Protection:* Experiments are in progress with a new model of a giant orchard heater, with artificial fog and with the putting down of materials which absorb heat during the day and give it off during the night. The section of *Physiological chemistry* reports, *inter alia*, on table grape storage and gas storage of pears.

3140. LAWES AGRICULTURAL TRUST. 63(072)
Report of Rothamsted Experimental Station for 1946, 1948, pp. 114, 3s.

The greater part of this report is devoted to short accounts describing the work of the numerous departments of this Station. Detailed results are omitted as these are issued separately, for the most part in papers published in various scientific journals. A list of these papers is given, together with abstracts of them.

3141. LONG ASHTON. 634/635(42)
Annual Report of the Agricultural and Horticultural Research Station, Long Ashton, 1947, 1948, pp. 243.

An introduction by the director, which includes a condensed review of research activities, is followed by numerous articles from scientific officers grouped under the headings: fruit and vegetable culture, plant pathology, fruit and vegetable products. Abstracts from most of these articles appear elsewhere in this number.

3142. MAURITIUS. 633.61(698.2)
Eighteenth Annual Report Sugarcane Research Station, Mauritius, 1947, 1948, pp. 58, 75 cents.

The notable success of the seedling varieties bred by the Station is shown by the fact that they accounted for 81% of the 1946 sugarcane crop and that by the end of 1947 over 95% (estimated) of the cane area was under these kinds. The most successful of the clones are M.134/32 (outstanding) and M.171/30. The growth capacity and drought-resistance of M.134/32 has led to modifications of previous conceptions of the influence of climate on crop growth. This variety is also cultivated on a large scale in the neighbouring French island of Réunion, where it has, so far, shown complete immunity to the prevailing mosaic disease. *Cane breeding:* An analysis is given of the numerous crosses made during the year, and the results of numerous yield trials with new seedling varieties are recorded. *Chemical Division:* As in recent years, the main work was concerned with the development of foliar diagnosis technique for determining the nutrient status of sugar-cane, the data for this study being obtained from a comprehensive series of factorial experiments for testing the effect of three levels of N, P and K in different climates and soils. Results are tabulated. *Botanical Division:* Herbicidal work is reported on weed species not hitherto investigated in Mauritius and suggestions are made for the chemical weeding of sugar-cane and "aloe" [*Furcraea gigantea*] plantations. The results from successful investigations into the use of organo-mercurial compounds for treating sugar-cane cuttings are reviewed. Experiments on the value of basaltic rock dust applied to the poor soils of the wet districts and on possible micro-element deficiencies in the same soils are reported.

3143. MINISTRY OF AGRICULTURE, LONDON. 63: 338
Agricultural Statistics 1939-44, United Kingdom, Part I with separate figures for England and Wales, Scotland, Great Britain and Northern Ireland. H.M.S.O., London, 1947, pp. 52, 1s.
Agricultural Statistics 1939-1944, England and Wales Part I. H.M.S.O., London, 1947, pp. 228, 4s.

The first of these gives the skeleton outline figures, the second the figures, broken up to a certain extent according to county, for the following horticultural items:—Acreage under (1) vegetables, (2) nursery stock, flowers and glass, small fruit, number of orchard trees. Production of hops, orchard fruits and small fruits. Numbers of workers. Numbers of named agricultural machines.

3144. MINISTERIE VAN LANDBOUW, VISSERIJ EN VOEDSELVOORZIENING. 016: 63
Landbouwdocumentatie. **(Agricultural abstracts.)** 1948, 4: 685-712, 's-Gravenhage, kamer 415, Bezuidenhoutseweg 30, weekly, 10 guldens or £1 a year.

Attention is drawn to this journal of the Dutch Ministry of Agriculture consisting of indicative abstracts of articles in agricultural journals and notes on books, reports and bulletins. The coverage is wide, and items of purely horticultural interest are few. Items are classified and arranged under the Universal Decimal System.

3145. NORTHERN NUT GROWERS' ASSOCIATION INC. 634.5
Proceedings of the 30th to 37th annual conventions of the Northern Nut Growers Association Inc., 1940-1946, pp. 189, 136, 102, 126, 124, 120 and 135 [received 1948].

Among the many matters of interest to nut growers may be mentioned the " tin can " method of planting nuts, described in the 1946 report. " One end of a No. 2 can is removed and a cross is cut in the other end with a heavy-bladed knife. The open end of the can is then forced into the ground, over the planted nut, so that the top lies flush with the ground level. The four corners at the centre of the cut top then are turned slightly upward, to allow a small opening through which the hypocotyl of the developing seedling can emerge. The can completely disintegrates by rusting within two or three years [in the eastern States], and does not interfere with the seedling's development." The can gives protection against rodents and greatly increases the seedling's chance of survival.

3146. NORTHERN NUT GROWERS' ASSOCIATION INC. 634.5
Proceedings of the 38th annual convention of the Northern Nut Growers Association Inc., 1947, pp. 129.

In addition to general papers on nut cultivation in various districts in North America, this volume includes accounts of walnut grafting, of breeding Chinese chestnuts and filberts, and of a Chinese chestnut rootstock experiment. Dormancy is considered at length in a paper on factors influencing the hardiness of woody plants, with particular reference to nut trees.

3147. OHIO. 634/635(771)
65th Annual Report of the Ohio Agricultural Experiment Station for year ended June 30th, 1946, being *Bull. Ohio agric. Exp. Stat.* **673,** 1947, pp. 100, bibl. 69, illus.

This report contains much of horticultural interest. Irrigating strawberries augmented the crop by increasing the number of runner plants. Work is reported on the control of pests and diseases of fruit and vegetables. Varietal differences exist in the susceptibility of tomatoes to anthracnose and wilt. Vegetables growing on old muck soils are benefited by a green manure crop of soya beans. The use of closed bags greatly reduced loss in weight from vegetables stored in a room where it was difficult to maintain high humidity. Tests with potatoes in gravel culture showed that decreasing the O_2 in the atmosphere of the roots reduced growth. The effects of night temperature on greenhouse tomatoes are being investigated. Cracking of tomato fruits was reduced by pruning the plants to three stems instead of one; some fungicides also reduced it. In the section on ornamental plants work is reported on the following plants: hydrangeas, chrysanthemums, carnations, roses and asters.

3148. RIEMENS, J. M. (Editor). 635.1/7(492)
Mededelingen van het Rijkstuinbouwconsulentschap **(Journal of the State Horticultural Advisory Service).**
South Holland Glasshouse District, Naaldwijk, 1947, No. 5, pp. 17-20.

An information sheet issued monthly from the Glasshouse Research Station of the Province of South Holland at Naaldwijk, the most important vegetable growing district of the Netherlands. The notes deal with the cultivation and protection of salad and fruit crops and ornamentals under glass, and with fruitgrowing in the open. In this number there is an account of the commercial use of cucumber plants grafted on *Cucurbita ficifolia,* which is resistant to *Fusarium.*

3149. THE ROYAL SOCIETY, LONDON. 016
Recommendations adopted by The Royal Society, Scientific Information Conference 1948, London, pp. 19.

The conference, held in London from 21 June to 2 July, 1948, discussed the possibility of improving the existing methods of producing, abstracting, indexing, and distributing scientific literature. The numerous recommendations made are grouped under the heads: general, publication of papers reporting original work, abstracting services, reviews and annual reports, library and information services, classification and indexing, aids to information services, methods of reproduction.

3150. CEYLON RUBBER RESEARCH SCHEME. 633.912(548.7)
Report of the work of the Rubber Research Board, Ceylon, in 1946, 1947, pp. 33 + appendices.

Chemical Department: Work on the control of plasticity and the hardening-softening relationship of rubber under the influence of certain chemicals are reported. Concentrations of benzidine as low as 1 molecule per 50,000 isoprene units produced a detectable reduction in the plasticity of raw rubber, while 0·1 to 0·4% of the reagent increased the tensile strength more than tenfold and greatly reduced the solubility of the rubber in the usual solvents. In general, aromatic substances containing at least two primary amino-groups were found to be stiffening agents. *Botanical and Mycological Department:* Work is reported on studies of clones and seedling families, methods of establishing bud-grafts in the field, rootstock trials, and tapping experiments. *Soils Department:* The results of manurial trials are reported. *London Advisory Committee for Rubber Research (Ceylon and Malaya):* The 1946 report of this committee, which is included, contains a short summary of research on quality in rubber and preserved latex.

3151. CEYLON RUBBER RESEARCH SCHEME. 633.912(548.7)
Report of the work of the Rubber Research Board, Ceylon, in 1947, 1948, pp. 41.

Chemical Department: Research is reported on control of plasticity from which it appears that softening of rubber by nitro-compounds and hardening by amines are probably connected processes and that softening by nitro-compounds may not be due to accelerated oxidative breakdown. It would also appear that the diamines are active only in the

non-ionized form. *Botanical and Mycological Department:* The epidemiology of *Oidium* is treated at some length. The control of *Oidium*, *Phytophthora* leaf-fall and root disease (*Fomes lignosus*) are discussed. Trials are reported on: new clones and seedling families, rootstocks, stem and branch budding, and tapping experiments. *Soils Department:* The results of manurial trials are tabulated. *Report of London Advisory Committee:* Research is reported on: properties of dry rubber, gelling and peptizing agents, and the non-rubber substances in preserved latex. Brief reference is made to the pilot plant being erected in London for the preparation of dry rubber by a continuous process.

3152. St. Vincent. 633/635(729.82)
Annual Report on the Agricultural Department, St. Vincent, for 1947, 1948, pp. 26.
Includes short notes on: an arrowroot manurial trial; arrowroot selection; variety trials with sweet potatoes, yams, beans, carrots, eggplant, tomatoes, pigeon peas and sugar-cane.

3153. South Australia. 63(942)
Reports of the Minister of Agriculture, South Australia, for the years ended 30th June 1945 and 30th June 1946, 1946, pp. 38; and 1947, pp. 42.
The reports of the Chief Horticulturist and Chief Inspector of Fruit cover the administration of State acts and the investigations in progress at Blackwood and Fullarton Experimental Orchards, Berri Experimental Orchard and the State Viticultural Station at Nuriootpa. The return of the staff to its normal duty after the war has permitted an extension of the research programme. Brief accounts are given also of the work carried out in the vineyard, orchard and wine cellars of Roseworthy Agricultural College.

3154. (Stations de Recherche Agronomique.) 631.8: 633/635(44)
Recherches sur le fertilisation effectuées 1945-1946 par les Stations agronomiques. **(Manurial investigations carried out by French agricultural stations in 1945-46.)**
Ann. agron. Paris, 1947, **17**: 801-75.
The present report includes the following new items (see *H.A.*, 17: 1989): (1) *Fertilizer requirements of apple orchards under grass* in the Puy-de-Dôme (G. Guyon and D. Collier, Clermont Ferrand). Data on physical soil structure and chemical composition are tabulated. While the nutritional status of some orchards is satisfactory, other soils are deficient in phosphorus and to some extent in potassium. (2) *Manuring potatoes* (G. Guyon and D. Collier). Whether stable manure was applied or not, optimum yields were obtained only by means of additional, mineral nitrogen applications. (3) The bark of annual shoots is the most suitable tissue for analysis to determine the *nutritional status of peaches* (L. Depardon, Blois). The shoots selected for sampling must be of identical diameter. (4) *Manuring apples and pears by fertilizer lance* (L. Depardon). The average weight of fruits from apple trees to which a liquid 1·5-1-3 fertilizer was applied by soil injection was 124·7 g., as compared with a weight of 99 g. of fruits from trees manured with the same amount of solid fertilizer incorporated in the soil by cultivation. In pears the fertilizer lance method increased the average number of fruits per tree from 44 to 48, the average weight from 88 g. to 94·8 g. and total yields per tree from 3·85 kg. to 4·53 kg. (5) *Nitrogen manuring of asparagus* (L. Depardon). There was no advantage in giving two applications of nitrogen to asparagus in March and June rather than supplying the whole amount in one application before earthing up. (6) *Changes in the bases K_2O, CaO and MgO during the development of the leaf in some perennial plants* (L. Maume and J. Dulac, Montpellier). The trends observed apply to the biochemistry of vine leaves, irrespective of soil and rootstock. (7) *Cover crops for apricots and plums* (L. Maume and J. Dulac). Without irrigation annual cover crops—vetch and oats—proved detrimental to fruit trees in the Mediterranean climate.

3155. (Stations de Recherche Agronomique.) 631.8: 633/635(44)
Recherches sur la fertilisation effectuées en 1947 par les stations agronomiques. **(Manurial investigations carried out by French agricultural stations in 1947.)**
Ann. agron. Paris, 1948, **18**: 304-84.
The reports include the following items of horticultural interest: (1) *A study of phosphoric acid during the formation of the tomato fruit.* (A. Hamy, Châteauroux.) During fruit maturation mineral phosphoric acid is transformed into organic phosphoric acid. (2) *Chemical changes in the flower buds of peach during the winter.* (J. Liwerant, Toulouse.) The data presented show that during the winter N, P_2O_5 and K_2O increase in the flower buds of peach, while CaO and MgO decrease. Since the increase in nutrients takes place at the expense of the branches carrying the flower buds, manurial treatments should aim at a high N, P_2O_5 and K_2O level of the tree top in autumn. The interdependence of potassium on the one hand and calcium and magnesium on the other, observed in fruit tree leaves, was confirmed for the flower buds of peach. (3) *The effect of seed size on yield in potato.* (Y. Coïc, Quimper.) Medium sized (30-60 g.) proved superior to large sized (60-120 g.) whole tubers. (4) *Chlorosis in apple and pear.* (L. Depardon and P. Buron, Blois.) Determinations were made of the total and available calcium content of soils in which pear and apple trees developed chlorosis. Reinette du Mans on seedling rootstock proved more resistant than Calville and Reinette grise du Canada on doucin or paradise. (5) *Growth substance treatment of potato tubers* (S. Trocmé and G. Barbier, Versailles), though delaying sprouting, did not affect composition, so far as sugars were concerned. During 2 months' storage the total sugar content in both treated potatoes and controls rose from 0·3% to 1·3% of the fresh weight, and the ratio saccharose:reducing sugar increased. (6) The data emphasized the importance of *potassium manuring of potatoes* (P. Boischot and G. Barbier, Versailles), even in a soil comparatively rich in this nutrient. Differences in method of application did not produce a significant effect. (7) *Nitrogen deficiency in apple orchards under grass.* (G. Guyon, Clermont-Ferrand.) In Auvergne, Canada Reinette orchards under grass showed wide-spread and severe symptoms of decline and die-back, the result of nitrogen deficiency. Affected trees began to recover immediately when sufficient nitrogen was applied to the root zone either by fertilizer lance or by means of a crowbar. It is estimated that complete recovery will take 2-3 years. Declining trees should receive 4-6 kg. of nitrogen fertilizer in 3 applications, in February or March, after fruit set and in July. An extraordinarily quick response was obtained by feeding a 0·5% ammonium nitrate solution directly into the trunk from a suspended flask. This method was used for diagnostic purposes. (8) *Manuring potatoes.* Experiments reported at some length concern the comparative merits of organic and mineral fertilizers and of various combinations of minerals and the effect of meteorological conditions on fertilizer utilization. (9) *Manuring fruit and vines by fertilizer lance.* (L. Depardon and G. Buron.) While in the case of fruit trees the latest data give further evidence of the superiority of the lance method of injecting fertilizer solutions into the soil over surface application, vines were found to respond better to the incorporation into the soil of a solid fertilizer. (10) *Soil applications of DDT and Gammexane* (G. Drouineau, P. Gouny and T. Lahaye, Antibes). Laboratory tests showed that soil applications at the rate of 50-500 g. of the active substance per 100 m² had no detrimental effect on the number of *Azotobacter*, on nitrification, or on soil respiration. (11) *Mosaic of*

potato foliage (Y. Coïc and Mlle Lacoste) was shown not to have been caused by a virus. The investigation suggests that the trouble is due to potassium deficiency. (12) *Hair sprout of potato* (Y. Coïc, R. Prieur and Mlle Durroux, Quimper). In 1945 this physiological disease was prevalent in Brittany, affecting several varieties and up to 70% of the tubers in certain cases. Data on the chemical composition of healthy and diseased tubers are tabulated. It is suggested that the trouble results from a failure to utilize the reserve materials in the tuber, though a fuller explanation of the faulty mechanism can, as yet, not be offered. (13) The report concludes with a bibliography of the papers published by the Stations agronomiques in 1947.

3156. TANGANYIKA TERRITORY. 633.73(678.2/9)
Thirteenth Annual Report of the Coffee Research and Experiment Station, Lyamungu, Moshi, for 1946, 1948, pp. 15, 50 cents (6d.), being *Pamphl.* **45.**

The following items are selected from the numerous field experiments reported. Method of planting: results over 7 crops show that ball planting and bare root planting at nursery level are sound and profitable practices. Converting bushes from single to multiple stem: the best methods are to cut off (1) all east or west side primaries or (2) all primaries except the top three pairs, and then, in each case, to allow three suckers to grow from the bottom of the main stem. Mulch experiments with and without sulphate of ammonia: results, with clonal coffee, over 5 years show that sulphate of ammonia was beneficial in one season only—a wet year. Multiple *versus* single stem coffee bushes: the multiple stem system recommended has continued to maintain its great superiority (80% more crop than from the single stem system). The statistical significance of all experimental results is shown.

3157. U.S. DEPARTMENT OF AGRICULTURE. 63(73)
Yearbook of Agriculture 1948. Grass.
Supt. Documents, Washington, D.C., 1948, pp. 892, illus., $2.00.

This impressive volume contains 128 articles covering almost every conceivable aspect of grass growth and utilization except—strange omission—the management of grass in orchards.

3158. VERMONT STATE HORTICULTURAL SOCIETY. 634.1/7(743)
Proceedings of the 52nd Annual Meeting of the Vermont State Horticultural Society, 1948, pp. 106.

The value to the public of these surveys of developments in certain fields of pomology by experts has been noted in *H.A.*, 17: 1860. Papers read include the following: Smith, W. W., Dwarf and hardy fruit stocks, pp. 20-5; Blasberg, C. H., and Calahan, C. L., Pruning apple trees, pp. 26-68, bibl. 36; Burrell, A. B., The cost factor in spraying for disease and insect control, pp. 74-85; Hoffman, M. B., Chemical thinning of apples, pp. 89-93; Hills, C. H., Apple processing possibilities in Vermont, pp. 98-106, bibl. 17.

3159. WASHINGTON. 634/635(797)
Fifty-sixth Annual Report of the State College of Washington Agricultural Experiment Stations for 1946, pp. 121, being *Bull.* **482** [received 1948].

Investigations into the following subjects of horticultural interest, amongst others, are reported: cover crops in apple and prune orchards; fertilizers for orchards; arsenic toxicity in soils; codling moth control; aeroplane dusting with DDT; control of Pacific, European and other mites in orchards; spray residues on fruit; efficiency and design of orchard spray lines; effect of spray materials on fruit trees; pollination of apples, apricots and cherries; bees as pollinators; peach variety trials, propagation of peaches on own roots; control of cherry fruit flies; brown rot of stone fruit; preharvest drop of pears; grape varieties; orchard weeds; improving strawberry varieties; red stele and dud root of strawberries; small fruit variety tests; potato variety trials; potato pests and diseases; artificial manures for peas, asparagus, broccoli and cucumbers; sweet corn trials; pea variety trials; control of carrot rust fly; bean variety trials; vegetable seed treatments; sprinkler irrigation of vegetables; the production of vegetable seed and flower bulbs.

3160. " ZUID-HOLLANDSCH GLASDISTRICT " PROEFTUIN. 635.1/7(492)
Jaarverslag van de Proeftuin " Zuid-Hollandsch Glasdistrict " te Naaldwijk 1947. **(Annual report of the Province of South Holland Glass District Experiment Station, Naaldwijk, 1947.)** 47 pp.

In this report are summarized the results of many experiments of interest not only to glasshouse growers but also to horticulturists generally. Half the notes concern the control of pests and diseases, the newer insecticides and commercial preparations of them being discussed impartially. Cultural trials include experiments on vernalization, the use of growth substances to aid the setting of fruit in tomatoes, strawberries and plums, forcing strawberries and tomatoes by soil warming, etc. Notes are given on selection or breeding carried out with various crops, including flowers.

3161. ZÜRICH-OERLIKON. 633.491
Bericht über die Tätigkeit der Eidg. landwirtschaftlichen Versuchsanstalt Zürich-Oerlikon pro 1946/47. **(Report of the Zürich-Oerlikon agricultural research station for 1946/47.)**
Landw. Jb. Schweiz, 1948, **62**: 405-70.

This report contains little of horticultural interest. On p. 450 results of the use of borax on potatoes are mentioned; on the older arable lands there was little response but strikingly good results were obtained on a peat moor. In notes on potato diseases and pests a severe outbreak of Colorado beetle is referred to, and field experiments for its control are described (pp. 566-7), good results being obtained with a DDT preparation.

3162.
The following also have been examined:

a ARGENTINA.
Memoria de la Dirección de Frutas, Hortalizas y Flores, Años 1945 y 1946.
Secretaria de Industria y Comercio, Buenos Aires, pp. 27+163.
Chiefly analytical data of imports and exports of fruits and vegetables.

b *A.R. Dep. Agric. Basutoland for year ending 30th Sept. 1947,* pp. 28.

c *A.R. Dep. Agric. Bermuda, 1947,* pp. 16.

d *A.R. British Council for 1947-48,* London, 1948, pp. 88.

e *A.R. Dep. Agric. British Honduras 1946,* pp. 9 [received 1948].

f *A.R. Dep. Agric. Dominica 1946,* pp. 30 [received 1948].

g *16th A.R. Éire Minist. Agric., 1946-47,* pp. 171 +87, 5s.

h GUNSTON, J. 63
Farming.
Reason Why series, Herbert Jenkins, London, 1948, pp. 240, 7s. 6d.
A Question and Answer book, see 3111 above.

i *Twenty-first A.R. Northern Ireland agric. Res. Inst., Hillsborough, 1947-48,* 1948, pp. 39.

j *51st Annual Report of the Idaho Agricultural Experiment Station for the year ending June 30, 1944,* being *Bull. Idaho agric. Exp. Stat.* **255.**

k *Bienn. Rep. Ore. agric. Exp. Stat. 1938-40,* 1941, pp. 92.

l *Progress Report, Institute of Plant Industry, Indore, Central India, for year ending 31 May, 1947,* 1948, pp. 58.

m *A.R. Dep. Agric. Sierra Leone 1946,* 1948, pp. 32, 1s. 6d.

n *A.R. Dep. Agric. St. Lucia 1944,* pp. 14, 6d. [received 1948].

o DANISH STATE SEED TESTING STATION.
631.531(489)
Beretning fra Statsfrøkontrollen for det 76. Arbejdsaar fra 1 Juli 1946 til 30 Juni 1947. **(76th Annual Report of the Danish State Seed Testing Station for the year 1 July, 1946, to 30 June, 1947.)** [English summary 2½ pp.] *Tidsskr. Planteavl,* 1948, **52**: 1-68.
[See also 18: 2320.]

p *A.R. Dep. Agric. Tanganyika Territory 1946,* 1948, pp. 53, Shs. 2.

q *A.R. Sisal Exp. Stat. Tanganyika Territory Dep. Agric., 1944 and 1945,* pp. 16 and 18 [received 1948].

r *Biennial Report Utah Agricultural Experiment Station, 1944-1946,* 1947, pp. 42, being *Bull. Utah agric. Exp. Stat.* **327.**